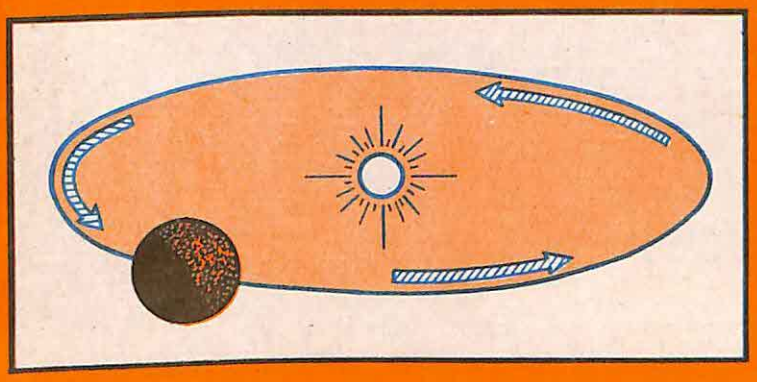
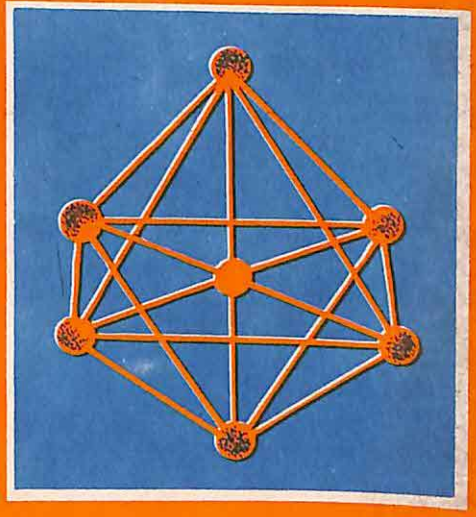
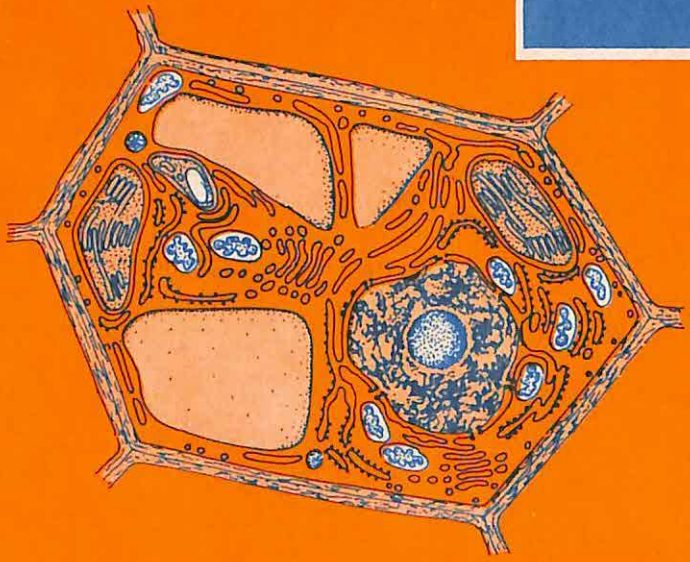
SCIENCE WORKBOOK

VOL. I FOR CLASS IX







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Based on the latest syllabus prescribed by C.B.S.E. New Delhi in the subject of Science based on New Education Policy

SCIENCE WORKBOOK

VOL. I

FOR CLASS IX

By

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PREFACE

This workbook to 'Science' has been written keeping in view the recently introduced integrated approach to the three science subjects, namely Physics, Chemistry and Biology for class IX. The chapters are based on the latest syllabus prescribed by the Central Board of Secondary Education, New Delhi according to the New Education Policy.

The workbook is designed not only to afford comprehensive practice of the entire course but also to drill students in examination techniques. It would also help the students to develop the ability of answering questions in a concise and precise manner. The students can thus identify the specific areas in which the understanding is yet to be achieved.

The questions are of thought-provoking type designed to make a pupil think and assimilate the concept fully. Questions of various types have been included so that students will find it useful for quick revision and practice before their final examination.

Any constructive suggestions for further improvement of this workbook will be highly appreciated and incorporated in the revised edition.

K. K. GUPTA

CONTENTS

1

The Nature of Matter

1. (*a*) What is matter ?

.....

(*b*) What is the basic unit of all material substances ?

.....

2. Who are known as naturalists ?

.....

3. What do astronomers study ?

.....

4. Who was the Indian philosopher to propose the theory of matter ?

.....

5. What is the contribution of John Dalton ?

.....

6. (*a*) Who proposed the atomic theory ?

.....

(*b*) State three basic postulates of Dalton's atomic theory :

(*i*) .....

(*ii*) .....

(*iii*) .....

(*c*) What was the main drawback of Dalton's atomic theory ?

.....

7. What observations of Dalton led to the formation of the Law of Constant Composition ?

.....

8. What is the Law of Constant Composition ?

9. Is there any difference between the Law of Constant Composition and the Law of Definite Proportions ?

10. Common salt is obtained from two different sources namely sea water and rocks. Will the samples exhibit different properties ? Give reasons.

11. State the Law of Multiple Proportions in your own words, with the help of a suitable example.

12. What is the ratio of weights of oxygen and hydrogen in pure water ?

13. (*a*) What do you understand by the term 'Element' ?

(*b*) What is the total number of elements known at present ?

(*c*) Name any five elements known to you.

. (*a*) What are compounds ?

(*b*) Name four compounds which are widely used at home.

15. Classify each of the following as element, compound or mixture :
water, air, sugar, oxygen, salt, milk, carbon dioxide, blood, gold and wood.

Elements	*Compounds*	*Mixtures*
.....	.....	.....
.....	.....	.....
.....	.....	.....
.....	.....	.....

16. What is a molecule ?

.....

.....

17. What is the difference between a molecule of an element and that of a compound ?

.....

.....

18. Name three elements which are found in the free atomic form :

(*a*) ..... (*b*) ..... (*c*) .....

19. Define the term 'Organic Chemistry'.

.....

.....

20. What are cathode rays ?

.....

21. State three main properties of cathode rays :

(*a*) .....

(*b*) .....

(*c*) .....

22. What observation led to the conclusion that cathode rays are made of negatively charged particles ?

.....

.....

.....

23. (*a*) What kind of rays were discovered by W.K. Roentgen ?

.....

(*b*) List three main properties of these rays :

(*i*) .....

(*ii*) .....

(*iii*) .....

(*c*) How are these rays helpful to us ?

.....

.....

24. When and by whom was radioactivity discovered ?

.....

25. (*a*) What do you understand by radioactivity ?

.....

.....

(*b*) Name the three types of radiations emitted by radioactive elements :

(*i*) ..... (*ii*) ..... (*iii*) .....

26. What is the charge on :

(*a*) Cathode rays ..... (*b*) Beta rays ..... (*c*) Gama rays .....

27. Name the three fundamental particles present in an atom :

(*a*) ..... (*b*) ..... (*c*) .....

28. Atoms are composed of electron, protons and neutrons. Which of these particles carries a :

(*a*) Positive charge ..... (*b*) Negative charge ..... (*c*) No charge.....

29. (*a*) What is a proton ?

.....

(*b*) Where is it located in an atom ?

.....

(*c*) How does it differ from a neutron ?

.....

30. (*a*) What is an electron ?

.....

(*b*) Where are they located in an atom ?

.....

(*c*) How do they differ from protons ?

.....

31. Compare an electron, a proton and a neutron in respect of mass and charge :

	Electron	*Proton*	*Neutron*
(*a*) Mass	.....	.....	.....
(*b*) Charge	.....	.....	.....

32. In Rutherford's scattering experiment some of the alpha particles when bombarded against a gold leaf were repelled. Give the reason for this observation.

.....

.....

33. How was it shown by Rutherford that the whole mass of an atom gets centred at its nucleus and the atom has a lot of empty spaces within it ?

.....

.....

.....

34. What were the conclusions drawn from Rutherford's experiment ?

(*a*) .....

(*b*) .....

35. What are the main features of Rutherford's model of an atom ?

(*a*) .....

(*b*) .....

(*c*) .....

36. What important discoveries were made by the following scientists ?

(*a*) J.J. Thomson : .....

(*b*) Rutherford : .....

(*c*) Chadwick : .....

(*d*) Goldstein : .....

(*e*) H. Bacquerel : .....

37. Which two types of particles are equal in number in an atom ?

.....

38. Why are the number of electrons and protons in an atom equal ?

.....

39. Explain why an atom is electrically neutral though it contains charged particles in it.

.....

40. What is the present day position of the structure of atom ?

.....

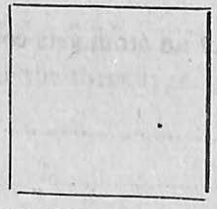
.....

.....

.....

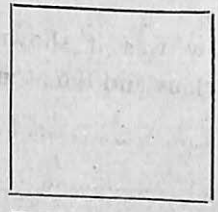
41. On the basis of Rutherford's model of an atom, draw the structures to represent the following atoms :

$^{12}_{6}C$

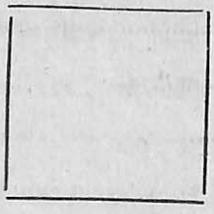


$^{19}_{9}F$

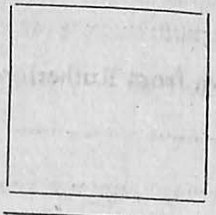
$^{23}_{11}Na$



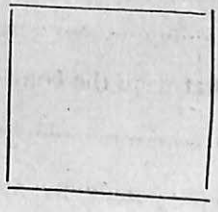
$^{40}_{20}Ca$



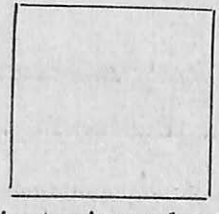
$^{40}_{18}Ar$



$^{14}_{7}N$



$^{16}_{8}O$



$^{24}_{12}Mg$

42. What is atomic number ?

.....

.....

43. What is the mass number of an element ?

.....

44. How is the mass number of an element calculated ?

.....

45. What is the relationship between atomic number, mass number and number of neutrons in the atom ?

.....

46. The atomic mass of an element is 35 and its atomic number is 17. What will be the number of electrons, protons and neutrons in the atom ?

.....

.....

47. An atom of potassium may be written as $^{39}_{19}K$:

(*a*) What does the figure 19 indicate ? .....

(*b*) What does the figure 39 indicate ? .....

(*c*) What is the number of protons in this atom ? .....

(*d*) What is the number of neutrons in this atom ? .....

48. Name two particles which actually determine the mass of an atom.

.....

49. Complete the given table :

S. No.	*Element*	*At. Number*	*Mass Number*	*Protons*	*Neutrons*	*Electrons*
1.	Lithium	3	7	.....	.....	.....
2.	Bromine	.....	.....	.....	45	35
3.	Aluminium	.....	.....	13	14	.....
4.	Sodium	11	.....	.....	12	.....
5.	Phosphorus	15	31	.....	.....	.....

50. Complete the following table :

S. No.	*Mass Number*	*Atomic number*	*Protons*	*Electrons*	*Neutrons*
1.	70	31	.....	.....	.....
2.	128	52	.....	.....	.....
3.	40	18	.....	.....	.....
4.	223	87	.....	.....	.....
5.	39	19	.....	.....	.....

51. What do you understand by the term 'Electronic configuration' of an element ?

.....

.....

52. What is the maximum number of electrons that can be accommodated in K, L and M shells of an atom ?

.....

53. An element has atomic number 17. How many electrons will be present in K, L and M shell of its atom ?

.....

54. If both K and L shells of an atom are full, what is the total number of electrons ?

.....

55. Write the distribution of electrons in the atoms of the elements whose atomic numbers are 2, 8, 12, 17, 20 and 35 respectively.

.....

.....

56. What are isotopes ? Give an example.

.....

.....

57. The isotopes of an element differ in atomic masses. What is this difference due to ?

.....

.....

58. Why do the isotopes of an element show identical chemical behaviour ?

.....

59. Carbon has two isotopes namely : $^{12}_{6}C$ and $^{14}_{6}C$. How do these differ and resemble from each other :

.....

.....

60. Two isotopes of chlorine have atomic number 17 and mass number 35 and 37 respectively. How will you represent them symbolically ?

.....

61. Three atoms of hydrogen are represented as $_{1}^{1}H$, $_{1}^{2}H$ and $_{1}^{3}H$. What name will you give to such a group of atoms ?

.....

62. What do you understand by radio-isotope dating ?

.....

.....

63. How do we estimate the age of old monuments, fossils and other archaeological samples ?

.....

.....

64. Explain the principle of radio-isotope dating.

.....

.....

65. What are valence electrons ?

.....

OBJECTIVE TYPE QUESTIONS

66. Fill in the blanks :

(*a*) The cathode rays consist of.....

(*b*) The capacity of L orbit is.....electrons.

(*c*) The existence of isotopes is due to the difference in the number of.....

(*d*) .....discovered the phenomenon of radioactivity.

(*e*) The mass of an electron is.....of the mass of a proton.

(*f*) The nucleus of an atom is made up of.....and.....

(*g*) The central part of an atom is called.....and is.....charged.

(*h*) All atoms of an element are.....

(*i*) .....rays are electromagnetic waves with very short wavelength.

(*j*) Uranium, Thorium and Polonium are.....elements.

67. Write true or false against each of the following statements :

(*a*) The nucleus of hydrogen has no neutrons. ( )

(*b*) Alpha rays are charged helium atom. ( )

(c) Neutron is the fundamental constituent of all substances. ( )

(d) The electrons first occupy the shells with lower energy. ( )

(e) The atom is positively charged. ( )

(f) Hydrogen, oxygen and silver are elements. ( )

(g) Argon, Neon, Krypton are known as rare gases. ( )

(h) Radioactivity was discovered by Henri Bacquerel in 1896. ( )

(i) Isotopes of an element have identical physical properties. ( )

(j) Radio-isotope dating works on the principle of half life. ( )

68. Provide scientific terms for the following statements :

(a) Number of protons in the nucleus.....

(b) Elements which are good conductor of electricity.....

(c) The rays which are electromagnetic in nature.....

(d) The property by which substances shine when exposed to light.....

(e) The circular path along which electrons revolve in an atom.....

69. Match the items of Column-I with those in Column-II :

Column-I	*Column-II*
(a) Mass number	Neutrons
(b) Atomic number	Radioactivity
(c) Neutrons	Protons
(d) Isotopes	Mass number—atomic number
(e) Henri Bacquerel	Nuclei that differ in mass
(f) Goldstein	Sum of proton and neutrons
(g) Thomson	Electrons
(h) Chadwick	Law of Multiple Proportion
(i) John Dalton	Atoms
(j) Matter	Compounds

70. **MULTIPLE CHOICE QUESTIONS**

1. Which of the following is heaviest ?

(a) Atom (b) Electron (c) Proton (d) Neutron

2. Atoms are made up of :

(a) Protons (b) Electrons (c) Neutrons (d) All of them.

3. Isotopes of an element differ from one another in their :

(a) Nuclear charge (b) No. of protons (c) No. of neutrons. (d) None of them.

4. The atomic mass and atomic number of an element are X and Y respectively. The number of neutrons in the atom of this element is :

(*a*) X (*b*) Y (*c*) X+Y (*d*) X−Y

5. Nuclear model of an atom was first suggested by :

(*a*) Thomson (*b*) Rutherford (*c*) Bohr (*d*) None of them.

6. The discovery of neutrons was made by :

(*a*) Bohr (*b*) Chadwick (*c*) Rutherford (*d*) Goldstein

7. The atomic number of an element is 20. Its electronic configuration is :

(*a*) 2, 8, 10 (*b*) 2, 8, 8, 2 (*c*) 2,18 (*d*) None of it.

8. Which of the following arrangements of electrons represent aluminium ?

(*a*) 2, 8, 1 (*b*) 2, 8, 2 (*c*) 2, 8, 3 (*d*) 2, 8, 4

9. In $^{35}_{17}Cl$ the superior figure 35 represents the :

(*a*) Atomic number (*b*) Mass number (*c*) Atomic weight (*d*) All of them.

10. The mass number of Beryllium is 9. It has 4 electrons and 4 protons. How many neutrons are there in its atom ?

(*a*) 4 (*b*) 5 (*c*) 8 (*d*) 13

□ □

2

How Elements are Classified

1. What was the necessity for the classification of elements ?

.....

.....

2. Name some of the elements which were among the first to be classified.....

.....

3. Give three examples each of :

(*a*) Alkali metals.....

(*b*) The halogens.....

(*c*) The alkaline earth metals.....

(*d*) Noble gases.....

4. Why do we call lithium, sodium and potassium as alkali metals ?

.....

.....

5. What is the meaning of the word 'Halogens'?

.....

6. Write the names, symbols, atomic numbers and electronic configuration of the halogens.

S. No	*Name*	*Symbols*	*Atomic Number*	*Electronic Configuration*
1.	.....	.....	.....	.....
2.	.....	.....	.....	.....
3.	.....	.....	.....	.....
4.	.....	.....	.....	.....
5.	.....	.....	.....	.....

7. How many elements were known to Mendeleev before his classification ?

.....

8. State the Periodic Law as given by Mendeleev.

.....

.....

9. What do you understand by the term 'Periodic functions of atomic masses' ?

.....

.....

10. What is Mendeleev's periodic table ?

.....

.....

.....

11. How many groups and periods were there in Mendeleev's original periodic table ?

.....

12. On what basis did Mendeleev arrange the elements in the periodic table ?

.....

13. What is the name given to the horizontal rows of the periodic table ?

.....

14. What do you call the vertical columns of the periodic table ?

.....

15. What is a period in a periodic table ?

.....

16. What is a group in a periodic table ?

.....

17. Which latest discovery led to a change in Mendeleev's law ?

.....

18. Define the Modern Periodic Law in your own words.

.....

.....

19. Who stated the Modern Periodic Law ?

.....

20. What is the contribution of Moseley ?

.....

21. How many groups and periods are there in the modern periodic table ?

.....

22. Indicate the number of elements present in different periods of the periodic table ?

.....

.....

23. Which is the largest period in the periodic table ?

.....

24. Which is the shortest period in the periodic table ?

.....

25. How many elements are contained in the longest period ?

.....

26. What is the characteristic of the last element in each period of the periodic table ?

.....

27. Give three main advantages of the periodic table :

(*a*) .....

(*b*) .....

(*c*) .....

28. What is the basis of the Modern Periodic Law ?

.....

29. What are the elements of the :

(*a*) Very short period.....

(*b*) Short period.....

30. To which group do the following belong ?

(*a*) Alkali metals..... (*b*) Alkaline earth metals.....

(*c*) Noble gases..... (*d*) The halogens.....

31. How is electronic configuration related to periodic classification ?

.....

.....

32. How is valency related to number of valence electrons ?

.....

.....

33. Give two examples each of :

(*a*) Monovalent elements..... (*b*) Divalent elements.....

(*c*) Trivalent elements..... (*d*) Zerovalent elements.....

34. In terms of electronic concept, what is metallic nature ?

.....

.....

35. What are electropositive elements ?

.....

.....

36. How does the metallic nature change ?

(*a*) Across a period : .....

(*b*) In a group : .....

37. How do atomic radii change in a period ?

.....

38. Why do atomic radii decrease acrosss a period ?

.....

.....

39. Classify the following elements into electropositive and electronegative :

K, Br, Na, F, Cl, Al, O, S, Ca, Mg.

.....

.....

40. Why does the atomic size increase down a group ?

.....

.....

41. In what part of a group would you expect the elements to have the greatest metallic character ?

.....

42. Why is Carbon tetravalent while Iodine is monovalent ?

.....

.....

43. To which group do you think the elements with atomic number 35 and 20 belong ?

.....

44. Given below are atomic numbers of the atoms of some elements :

18, 20, 33, 35, 11, 38, 15, 53, 16 and 85. Find out :

(*a*) Electronic configuration of each. .....

.....

(*b*) To which group does each belong ? .....

(*c*) To which period does each belong ? .....

(*d*) Which is an inert gas ? .....

(*e*) Which is an alkali metal ? .....

(*f*) Which are halogens ? .....

(*g*) Which are chemically similar elements ? .....

(*h*) Which elements belong to the same period ? .....

(*i*) Which elements are electropositive ? .....

(*j*) Which are non-metals ? .....

45. An element 'A' belongs to 3 period and group 1 A of the periodic table.

(*a*) Write its electronic configuration. .....

(*b*) What is its atomic number ? .....

(*c*) What will be its valency ? .....

(*d*) Is it a metal or a non-metal ? .....

(*e*) Will it be larger than magnesium or smaller ? .....

46. An element 'X' belongs to group VII A and third period of the periodic table. Find out :

(*a*) Electronic configuration .....

(*b*) Atomic number .....

(*c*) Valence electrons .....

(*d*) Valency .....

(*e*) Name of the element .....

(*f*) Symbol of the element .....

47. Take the help of the periodic table and write the names of four elements under each :

(*a*) IV A group : ..... (*b*) V A Group : .....

(*c*) VI A group : ..... (*d*) VII A Group : .....

(*e*) III A Group : ..... (*f*) Zero Group : .....

48. Write group or period against the following statements :

(*a*) Electronegativity increases from left to right : .....

(*b*) Valance electrons remains same : .....

(*c*) Atomic radii decreases from left to right : .....

(*d*) Tendency to lose the electrons decreases : .....

(*e*) Metallic character increases from top to bottom : .....

49. The atomic number of an element 'X' is 82. Find out :

(*a*) Group : ..... (*b*) Period : .....

(*c*) Valency : ..... (*d*) Symbol : .....

(*e*) Metals/Non-metals : ..... (*f*) Electronic configuration : .....

50. Compare Mendeleev's table with Modern Periodic table :

	Mendeleev's Table	*Modern Periodic Table*
(*a*)	.....	.....
(*b*)	.....	.....
(*c*)	.....	.....

51. An element 'X' belongs to II A Group of the periodic table. Write two general properties of this element.

(*a*) .....

(*b*) .....

52. Arrange the following in the order as directed :

(*a*) Increasing atomic size (Na, Li, K) : .....

(*b*) Increasing reactivity (F, Cl, Br) : .....

(*c*) Decreasing reactivity (K, Li, Na) : .....

53. There are four elements having the same number of valence electrons. State whether they belong to the same period or the same group of the periodic table ?

.....

54. An element 'X' belongs to Group II A and third period of the periodic table. State whether the element is a metal or a non-metal ?

.....

55. How was Mendeleev able to predict the existence of new elements ? Give an example.

.....

.....

56. Did Mendeleev leave some gaps for the inert gases in his table ?

.....

57. What forms the basis of the Modern Periodic law ?

.....

58. What is the difference between a period and a group ?

.....

.....

59. For each of the following pairs state which one is larger in size ?

(*a*) Cl, Cl^- ..... (*b*) Cl, Br .....

(*c*) Na, K ..... (*d*) K, K^+ .....

60. Which property of elements are responsible for the similar chemical behaviour of all the elements in a group of the periodic table ?

.....

.....

61. The electronic configuration of an element is 2, 8, 8, 2.

(*a*) To which period does it belong ? .....

(*b*) To which Group does it belong ? .....

(*c*) What will be the valency of this element ? .....

(*d*) Write the name and symbol of this element ? .....

62. The atomic numbers of three elements A, B and C are 5, 7 and 10 respectively.

(*a*) Which element belongs to zero Group ? .....

(*b*) Which element belongs to V Group ? .....

(*c*) Which element belongs to III Group ? .....

63. Why did Mendeleev leave some gaps in his periodic table ?

.....

.....

64. Why did Mendeleev put Titanium under Silicon ?

.....

65. Why does the size of the atom progressively become smaller from K to Br ?

.....

.....

66. Explain the following terms in your own words :

(*a*) Alkali Metals :

.....

.....

(*b*) Alkaline Earth Metals :

.....

.....

(*c*) Noble Gases :

.....

.....

OBJECTIVE TYPE QUESTIONS

67. Fill in the blanks :

(*a*) The basis of the Modern Periodic table is atomic.....

(*b*) The horizontal rows in the periodic table are called.....

(*c*) A very short period contains.....elements.

(*d*) In a period, atomic radii.....from.....to.....

(*e*) Alkali metals belongs to Group.....

(*f*) .....belongs to Group VII A.

(*g*) The seventh period is an.....period.

(*h*) The valency of elements in a.....remain same.

(*i*) There are.....Groups and.....periods in the modern table.

(*j*) The atomic size of Lithium is.....than that of sodium.

68. Write True or False :

(*a*) The atomic number is the fundamental property of elements. ( )

(*b*) Size of atom increases on going down a group. ( )

(c) All the elements in a group have the same number of valence electrons. ( )

(d) Longest period contains 18 elements. ( )

(e) First period contains two elements. ( )

(f) The horizontal rows are known as groups in the table. ( )

(g) The periodic table has enabled us to predict new elements. ( )

(h) All alkali metals have seven valence electrons. ( )

(i) Modern periodic table is based on mass number. ( )

(j) In the fourth period there are 32 elements. ( )

69. Match the following :

Column I	*Column II*
(a) Period	Chlorine
(b) Group	Sodium
(c) Alkali Metals	Modern Periodic Law
(d) Moseley	Vertical Columns
(e) Halogens	Calcium
	Horizontal Rows

MULTIPLE CHOICE QUESTIONS

70. 1. Which element has the highest atomic radii ?
(a) F (b) Cl (c) Br (d) I

2. The properties of the elements are periodic function of their :
(a) Atomic number (b) Mass number (c) Atomic size (d) Atomic weight

3. Which of the following is not a noble gas ?
(a) Helium (b) Neon (c) Oxygen (d) Krypton

4. The Alkaline earth metals have valence electrons :
(a) 1 (b) 2 (c) 6 (d) 7

5. Within a group of the periodic table the valencies of elements change from :
(a) 1 to 4 (b) 1 to 8 (c) 0 to 8 (d) remain unchanged

6. The basis of the Modern Periodic table is :
(a) Atomic number (b) Atomic weight (c) Mass number (d) None of t hese.

7. Which of the followi g has the least non-metallic character ?
(a) Fluorine (b) Chlorine (c) Iodine (d) Bromine

8. The number of periods in the Modern Periodic Table is :
(a) 6 (b) 7 (c) 8 (d) 9

9. The number of vertical rows in the Moseley Periodic Table is :
(a) 6 (b) 12 (c) 16 (d) 18

10. The Modern Periodic Table was given by :
(a) Moseley (b) Mendeleev (c) Newland (d) Lavosier.

□ □

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3
Chemical Bonding

1. What is a chemical bond ?

.....

.....

2. What is real cause of chemical bonding ?

.....

.....

3. What is the cause of the inertness of noble gases ?

.....

4. Does any energy change take place during bond formation ?

.....

5. Which part of the atom is involved in chemical bonding ?

.....

6. Why are elements other than inert gases reactive ?

.....

7. How many valence electrons are possessed by elements other than inert gases ?

.....

8. On what does the valency of an element depend ?

.....

9. Are there any elements which do not form chemical bond ?

.....

10. (*a*) What are ions ?

.....

(*b*) How are they formed ?

.....

11. (*a*) What kind of charge is left on the atom that gains electrons ?

.....

(*b*) What kind of charge is left on the atom that loses electrons ?

.....

12. (*a*) What are cations ?

.....

(*b*) How are they formed ?

.....

13. (*a*) What are anions ?

.....

(*b*) How are they formed ?

.....

14. State one difference between an atom and an ion ?

Atom	*Ion*
(*a*)	(*b*) .....

15. (*a*) What is the difference between a sodium atom and a sodium ion ?

.....

(*b*) Will their properties be the same or different ?

.....

16. (*a*) What is the difference between a chlorine atom and a chloride ion ?

.....

(*b*) Will their properties be the same or different ?

.....

17. What is the difference between a cation and an anion ?

Cation	*Anion*
(*a*)	.....
(*b*)	.....

18. What is the nature of charge on a cation and an anion ?

.....

19. (*a*) Name three cations : .....

(*b*) Name three anions : .....

20. A neutral atom X loses two electrons. What type of ion will it form ?

.....

21. What is the number of electrons in the following ionic species of elements :

Al^{+3}, Ca^{+2}, S^{-2}, Na^{+1}. Cl^{-1}, O^{-2}.....

22. The atomic number of an element 'X' is 17. What must an atom of X do to attain the noble gas configuration ?

.....

23. Explain why a sodium ion is more stable than a sodium atom.

.....

.....

24. How are chemical bonds formed ?

.....

.....

25. What are the two ways in which an atom can acquire the inert gas configuration ?

(*a*) ..... (*b*) .....

26. What are the two main types of chemical bonds ?

(*a*) ..... (*b*) .....

27. What is an electrovalent bond ?

.....

.....

28. Illustrate the formation of an electrovalent bond in NaCl.

.....

.....

29. State four properties of electrovalent componds :

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

30. Give four examples of electrovalent compounds :

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

31. Why are electrovalent compounds also called ionic compounds ?

.....

32. What type of atoms usually combine to form ionic compounds ?

.....

33. In what solvent are ionic compounds soluble ?.....

.....

34. What type of bond is formed by the sharing of electrons between two atoms ?.....

.....

35. What is meant by covalent bonds ? Give an example.

.....

.....

36. What is meant by double covalent bonds ? Give an example.

.....

.....

37. What is a triple covalent bond ? Give an example.

.....

.....

38. What are covalent compounds ?

.....

.....

39. State four properties of covalent compounds :

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

40. Why do covalent compounds not conduct electricity ?

.....

41. Distinguish between electrovalent and covalent compounds :

	Electrovalent compounds	*Covalent compounds*
(*a*)	.....	.....
(*b*)	.....	.....
(*c*)	.....	.....
(*d*)	.....	.....

42. What type of bond will be formed when an electropositive element combines with an electronegative element ?.....

43. Why do ionic compounds have high melting and boiling points ?

.....

.....

44. Ionic compounds are good electrolyte in the molten as well as dissolved state, but not in solid state. Give a reason.

.....

.....

45. In the formation of compound XY, atom of X lost three electrons while atom of Y gained three. Predict two properties of compound XY.

(*a*) .....

(*b*) .....

46. Why are covalent compounds mostly in gaseous or liquid state ?

.....

.....

47. How do reacting atoms get the inert gas configuration in the formation of the following :

(*a*) An electrovalent compound : .....

(*b*) A covalent compound : .....

48. Give the formulae of the two chlorides of the element X and Y having atomic numbers 14 and 20 respectively. Will the properties of two chlorides be similar or different. Justify.

.....

.....

49. The atomic numbers of three element X, Y and Z are 19, 17 and 6 respectively. Answer the following questions :

(*a*) Which of these element is a metal ?.....

(*b*) Which of these elements are non-metals ?.....

(*c*) Which two elements will form electrovalent compounds ?.....

(*d*) Which two elements will form covalent compounds ?.....

(*e*) Which will have high melting points ? XY or YZ ?.....

50. What is the usual number of electrons in the outer most shell of a

(*a*) Stable atom : ..... (*b*) Stable ion : .....

51. A compound when dissolved in water conducts electric current. What is the nature of bond in the compound ?.....

52. A solid is soluble in water and has high melting point. What type of bond do you expect in this solid substance ?.....

53. An element X combines with oxygen to form an oxide X_{20}. How many electrons would be there in the outer most shell of the element X ?.....

54. The atomic number of sodium is 11 and that of sulphur is 16. Using electron dot symbols, show how an ionic compound of sodium and sulphur is formed.

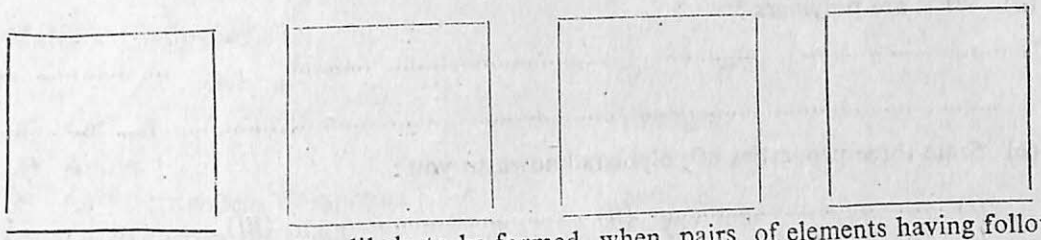
55. Two atoms of an element X combine to form a molecule X_2. What is the nature of bond in molecule X_2 ?.....

56. What will be the nature of chemical bond formed between the two atoms of the same element ?.....

57. Give examples of the molecules containing :

(*a*) Single bond : ..... (*b*) Double bond : ..... (*c*) Triple bond : .....

58. What type of bond is formed in $CaCl_2$, Cl_2, CH_4, NaCl, N_2, H_2, O_2



59. Predict the type of bonding likely to be formed when pairs of elements having following atomic numbers combine :

(*a*) 3 and 7 : ..... (*b*) 6 and 9 : .....

(*c*) 11 and 16 : ..... (*d*) 14 and 12 : .....

60. Which type of bond is formed by the sharing of four electrons by two atoms ?

.....

61. Which type of bond is formed by the sharing of 6 electrons by two atoms ?

.....

62. Identify the nature of bond in the following substances :

(*a*) $MgCl_2$: ..... (*b*) CH_4 : ..... (*c*) HCl : .....

(*d*) NH_3 : ..... (*e*) H_2O : .... (*f*) MgO : .....

63. The valencies of four elements A, B, C, D are 1, 2, 3, 4 respectively.

(*a*) What will be the formula of sulphate of A ? .....

(*b*) What will be the formula of nitrate of B ? .....

(*c*) What will be the formula of oxide of C ? .....

(*d*) What will be the formula of chloride of D ? .....

64. What is the valency of :

(*a*) Nitrogen in NH_3 ..... (*b*) Hydrogen in CH_4 .....

(*c*) Potassium in K_2O ..... (*d*) Sodium in NaCl .....

65. For three elements X, Y and Z the following data is given :

Element	*Mass Number*	*No. of Neutrons*
X	35	18
Y	23	12
Z	24	12

Give the chemical formulae and nature of bond formed between

(*a*) X and X .....

(*b*) X and Y .....

(*c*) X and Z .....

66. (*a*) What are polymers ?

.....

.....

(*b*) State three properties of polymers known to you :

(*i*) ..... (*ii*) ..... (*iii*) .....

(*c*) Name three polymers which are widely used now-a-days :

(*i*) ..... (*ii*) ..... (*iii*) .....

OBJECTIVE TYPE QUESTIONS

67. Fill in the blanks :

(*a*) An electrically charged atom is called .....

(*b*) Ionic compounds are highly soluble in .....

(*c*) .... compounds are formed by complete transfer of .....

(*d*) Inert gases form ..... molecules

(*e*) Cations are formed when ..... are ..... by the atom.

(*f*) Generally ..... compounds are either gaseous or ..... .

(*g*) Atoms combine to attain ..... .

(*h*) Cations are ..... in size than the neutral atom.

(*i*) Non-metals among themselves unite by ..... electrons.

(*j*) In forming N_2 molecule ..... electrons are ..... by each atom of nitrogen.

68. Indicate whether the following statements are true or false ?

(*a*) Covalent compounds are usually soluble in water. ( )

(*b*) Ionic compounds conduct electric current. ( )

(*c*) Ionic compounds furnish ions in aqueous solutions. ( )

(*d*) Anions are smaller than the neutral atom in size. ( )

(*e*) Covalent compounds generally have high melting points. ( )

(*f*) A neutral atom acquire positives charge on gaining electrons. ( )

(*g*) Covalent compounds are also known as ionic compounds. ( )

(*h*) Carbon does not form ionic compounds. ( )

(*i*) Electrovalent bonds are directional in nature. ( )

(*j*) Nylon, PVC, Neoprene are examples of polymers. ( )

69. Match the following :

Column I	*Column II*
(*a*) Cations	Nitrogen
(*b*) Anion	Oxygen
(*c*) An Electrovalent Compound	Sodium
(*d*) Double Covalent Bond	NaCl
(*e*) Triple Covalent Bond	Polythene
(*f*) Polymer	K^+
	S^-

70. Tick mark the best answer :

1. A cation is formed by :

   (*a*) Sharing an electrons (*b*) Donating an electron
   (*c*) Gaining an electron (*d*) None of these.

2. The nature of charge on anion is :

   (*a*) Positive (*b*) Negative (*c*) Neutral (*d*) None.

3. Which has the highest melting point in the following ?

   (*a*) Water (*b*) CCl_4 (*c*) NaCl (*d*) HCN

4. Two elements A and B combine to form a compound A B which has a high melting point and conducts electric current in molten state. The compound will be :

   (*a*) Electrovalent (*b*) Covalent (*c*) Neutral (*d*) None.

5. Triple covalent bond is present in :

   (*a*) H_2 (*b*) O_2 (*c*) N_2 (*d*) Cl_2

6. Which of the following will share four electrons between them ?

   (*a*) H_2 (*b*) Cl_2 (*c*) N_2 (*d*) O_2

7. Which of the following cannot form cations ?

   (*a*) K (*b*) Na (*c*) S (*d*) Al.

8. What is the valency of carbon in CCl_4 ?

   (*a*) 1 (*b*) 2 (*c*) 3 (*d*) 4.

9. The number of electrons needed by oxygen atom to achieve the electronic configuration of the Neon atom is :

   (*a*) 1 (*b*) 2 (*c*) 3 (*d*) 4.

10. In water, the two bonds are apart at an angle of :

    (*a*) 101° (*b*) 102° (*c*) 105° (*d*) 109°.

□□

4

Chemical Reactions

1. What is meant by a chemical reaction ?

.....

.....

2. What happens to the bonds in a chemical reaction ?

.....

.....

3. Can you name four chemical reactions which take place in your daily life ?

(*a*) ..... (*b*) .....

(*c*) ..... (*d*) .....

4. Write the names of four types of chemical reactions known to you :

(*a*) ..... (*b*) .....

(*c*) ..... (*d*) .....

5. State what is meant by 'reaction of combination'. Give an example.

.....

.....

6. What do you understand by reaction of decomposition ? Give an example.

.....

7. What happens to the bonds in reaction of decomposition ?

.....

8. What is thermal decomposition ?

.....

9. What is a displacement reaction ? Give an example.

.....

.....

10. With the help of an experiment show a displacement reaction.

.....

.....

.....

.....

11. What happens when iron filings are added to a solution of copper sulphate ?

.....

.....

12. Which element is able to displace other element from the compound ?

.....

13. What is the reaction in which a compound is built up from its elements or from simple compounds, called ?

.....

14. Name the type of reactions under each of the following :

(*a*) $H_2 + O_2 \longrightarrow H_2O$ .....

(*b*) $H_2O \longrightarrow H_2 + O_2$ .....

(*c*) $CaO + H_2O \longrightarrow Ca(OH)_2$ .....

(*d*) $CaCO_3 \longrightarrow CaO + CO_2$ .....

(*e*) $Fe + CuSO_4 \longrightarrow FeSO_4 + Cu$ .....

15. What is oxidation ? Explain with reference to formation of water.

.....

.....

.....

.....

16. What is reduction ? Give an example.

.....

.....

17. When hydrogen burns in oxygen, water is formed and when water is electrolysed hydrogen and oxygen is produced. What type of reaction takes place :

(*a*) in the first case : ..... (*b*) in the second case : .....

18. Give one example each (Chemical equations only) which represents :

(*a*) Combination reaction .....

(*b*) Decomposition reaction .....

(*c*) Displacement reaction .....

(*d*) Double displacement reaction .....

(*e*) Oxidation reaction .....

(*f*) Reduction reaction .....

19. State one important application of decomposition reaction.

.....

20. What is the contribution of Wholer ?

.....

21. What happens when (Give equations only)

(*a*) Lime is added to water .....

(*b*) Slaked lime reacts with carbon dioxide .....

(*c*) Lime stone is strongly heated .....

(*d*) Crystals of ferrous sulphate are heated .....

(*e*) Magnesium metal is put in a solution of $CuSO_4$ .....

22. Complete the following chemical reactions :

(*a*) $CaO + H_2O \longrightarrow$ ..... + ...

(*b*) $Ca(OH)_2 + CO_2 \longrightarrow$ ..... + ...

(*c*) $CaCO_3 \longrightarrow$ ..... + ...

(*d*) $FeSO_4 \longrightarrow$ ..... + ... + ...

(*e*) $Mg + CuSO_4 \longrightarrow$ ..... + ...

23. What do you understand by chemical formula of a compound ?

.....

.....

24. The chemical formula of water is H_2O. What information does it convey to you ?

(*a*) ..... (*b*) .....

25. What are the steps involved in writing the formula of a compound ?

(*a*) .....

(*b*) .....

(*c*) .....

26. When do we use brackets in writing a chemical formula ?

.....

27. What is the difference between 2N and N_2 ?

.....

28. Write the molecular formula of the following compounds :

(*a*) Calcium chloride : ..... (*b*) Sodium oxide : .....

(*c*) Ferric oxide : ..... (*d*) Chromium oxide : .....

(*e*) Potassium chlorate : ..... (*f*) Ammonium carbonate : .....

(*g*) Potassium permanganate : ..... (*h*) Manganese peroxide : .....

(*i*) Silver nitrate : ..... (*j*) Zinc phosphate : .....

29. Write the chemical formulae of the following compounds :

(*a*) Sodium sulphide : ..... (*b*) Zinc sulphate : .....

(*c*) Aluminium chloride : ..... (*d* Aluminium phosphate : .....

(*e*) Zinc oxide : ..... (*f*) Ferrous sulphide : .....

(*g*) Calcium nitrate : ..... (*h*) Zinc hydroxide : .....

(*i*) Calcium carbonate : ..... (*j*) Sodium carbonate : .....

30. Write the names of the following chemical compounds :

(*a*) Na_2SO_4 : ..... (*b*) $AlCl_3$: .....

(*c*) ZnO : ..... (*d*) $KClO_3$: .....

(*e*) $(NH_4)_2S$: ..... (*f*) $Cr_2(SO_4)_3$: .....

(*g*) CaO : ..... (*h*) $CaCO_3$: .....

(*i*) $AgNO_3$: ..... (*j*) $FeCl_3$: .....

31. What will be the chemical formulae and names of the compounds formed from the following ions/radicals ?

Ions/radicals	*Chemical formula*	*Name of the compound*
(*a*) Cu^{+1} and Cl^{-1}	.....	.....
(*b*) Al^{+3} and CO_3^{-2}	.....	.....
(*c*) Ca^{+2} and O^{-2}	.....	.....

(*d*) Fe^{+2} and S^{-2} .....

(*e*) NH_4^{+1} and SO_4^{-2} .....

(*f*) Al^{+3} and S^{-2} .....

(*g*) Zn^{+2} and CO_3^{-2} .....

(*h*) Fe^{+3} and CO_3^{-2} .....

(*i*) Na^{+1} and O^{-2} .....

(*j*) Zn^{+2} and NO_3^{-1} .....

32. Write the chemical formulae for the compounds whose common names are given below :

(*a*) Lime : ..... (*b*) Slaked lime : .....

(*c*) Limestone : ..... (*d*) Lime water : .....

33. What is a chemical equation ?

.....

.....

34. What information does a chemical equation convey to you ?

(*a*) .....

(*b*) .....

(*c*) .....

35. What are the three essentials of a chemical equation ?

(*a*) .....

(*b*) .....

(*c*) .....

36. What is the need for balancing a chemical equation ?

.....

.....

37. What is meant by skeleton and balanced chemical equation ?

.....

.....

38. What are the different methods of balancing chemical equations ?

(*a*) ..... (*b*) .....

39. How are heat changes expressed in a chemical equation ?

.....

40. What are the limitations in a chemical equation ?

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

41. How can chemical equations be made more informative ?

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

42. Put the following chemical equations in the language of chemistry :

(*a*) Sodium + Water ——→ Sodium hydroxide + Hydrogen

.....

(*b*) Calcium oxide + Water ——→ Calcium hydroxide

.....

(*c*) Calcium carbonate ——→ Calcium oxide + Carbon dioxide

.....

(*d*) Calcium hydroxide + Carbon dioxide ——→ Calcium carbonate + Water

.....

(*e*) Iron + Sulphuric acid ——→ Ferrous sulphate + Hydrogen

.....

43. Write down the following statements in the form of chemical equations :

(*a*) Sodium metal reacts with water to form sodium hydroxide and Hydrogen.

.....

(*b*) Hydrogen sulphide gas burns in air to give water and sulphur dioxide.

.....

(c) Carbons burn in air to form carbon dioxide.

.....

(d) Calcium carbonate on heating decomposes to form calcium oxide and carbon dioxide.

.....

(e) Hydrogen gas combines with nitrogen to give ammonia.

.....

44. How is the following information symbolised in a chemical equation ?

(a) Formation of a precipitate : .....

(b) Evolution of a gas : .....

(c) A reversible reaction : .....

(d) Absorption of heat : .....

45. What do the following symbols represents when put with the formula of a product in a chemical equation ?

(a) ↓ ..... (b) (l) .....

(c) ↑ ..... (d) ⇌ .....

(e) — Heat ..... (f) + Heat .....

46. Balance the following skeleton equations by the 'Trial and error' method :

(a) $C_2H_4 + O_2 \longrightarrow CO_2 + H_2O$

.....

(b) $H_2 + O_2 \longrightarrow H_2O$

.....

(c) $KClO_3 \longrightarrow KCl + O_2$

.....

(d) $Na + H_2O \longrightarrow NaOH + H_2$

.....

(e) $Mg + O_2 \longrightarrow MgO$

.....

(f) $NH_3 + O_2 \longrightarrow H_2O + N_2$

.....

(*g*) $KNO_3 \longrightarrow KNO_2 + O_2$

.....

(*h*) $P_4 + O_2 \longrightarrow P_4O_{10}$

.....

(*i*) $Al + O_2 \longrightarrow Al_2O_3$

.....

(*j*) $NaCl + H_2SO_4 \longrightarrow Na_2SO_4 + HCl$

.....

47. What is amu ?

.....

48. What is the relative atomic mass of an element ?

.....

.....

49. What is the unit of relative atomic mass ?

.....

50. What is gram atomic mass ?

.....

51. What is relative molecular mass ?

.....

.....

52. What is gram molecular mass ?

.....

53. Calculate the molecular weights of the following compounds. Use the table of atomic masses from your book.

Name of the compounds	*Formula*	*Molecular weights*
(*a*) Sulphuric acid	.....	.....
(*b*) Water	.....	.....
(*c*) Calcium carbonate	.....	.....
(*d*) Urea	.....	.....

(*e*) Sodium hydroxide ....

(*f*) Nitric acid ....

(*g*) Ammonium phosphate ....

(*h*) Aluminium chloride ....

(*i*) Calcium nitrate ....

(*j*) Zinc sulphate ....

54. Calculate the molecular weights of one molecule of the following :

(*a*) NaCl : .....

(*b*) CH_4 : .....

(*c*) Na_2CO_3 : .....

(*d*) SO_3 : .....

(*e*) H_2SO_4 : .....

55. Calculate the percentage of nitrogen in the following compounds :

(*a*) NH_3	(*b*) $(NH_4)_2SO_4$	(*c*) $CO(NH_2)_2$	(*d*) KNO_3
.....	.....	.....	.....
.....	.....	.....	.....
.....	.....	.....	.....

56. What is the formula to calculate the percentage of an element from a compound ?

.....

57. Explain the term mole in your own words.

.....

.....

58. How many particles are there in a mole of a substance ?

.....

59. What is the utility of the mole concept ?

.....

60. What is the numerical value of Avogadro's number ?

.....

61. Define Avogadro's Law in your own words.

.....

.....

62. How many atoms are there in 2 g carbon ?

.....

63. Calculate the mass of the following in grams :

(*a*) 2 moles of sulphuric acid : .....

(*b*) 0·25 mole of CaO : .....

(*c*) 0·50 mole of ammonia : .....

(*d*) 1·5 moles of CO_2 : .....

(*e*) 2·5 moles of SO_2 : .....

64. Convert the following into moles :

(*a*) 64 g O_2 : .....

(*b*) 120 g urea : .....

(*c*) 49 g H_2SO_4 : .....

(*d*) 20 g $CaCO_3$: .....

(*e*) 5·6 g CaO : .....

65. How many moles of chlorine atoms are present in one mole of the following compounds :

(*a*) HCl : ..... (*b*) $BaCl_2$: ..... (*c*) $AlCl_3$: .....

(*d*) CCl_4 : ..... (*e*) $FeCl_3$: ..... (*f*) NaCl : .....

66. How many atoms are present in :

(*a*) 10 g $CaCO_3$: .....

(*b*) 0·25 moles of H_2O : .....

67. Calculate the number of water molecules in a drop of water weighing 0·06 g.

.....

.....

68. How many grams of sodium will have the same number of atoms as 10 grams of calcium ?

.....

.....

69. How many moles of $KClO_3$ will be required to get 3 moles of oxygen ?

.....

.....

70. A chemist weighs 20 g water, 20 g oxygen and 20 g calcium carbonate. Which of them has the maximum number of molecules ?

.....

.....

71. Write the formula by which number of moles in a compound can be calculated.

.....

72. What mass of oxygen will contain the same number of molecules as :

(*a*) 1 mole of Nitrogen : .....

(*b*) 1·5 moles of water : .....

(*c*) $6{\cdot}023 \times 10^{23}$ molecules of SO_2 : .....

73. State the relationship between mole and Avogadros' number.

.....

74. How many moles of carbon dioxide are produced by decomposing two moles of calcium carbonate ?

.....

.....

75. Which contain more molecules : 0·64 g SO_2 or 44 g of CO_2 ?

.....

.....

76. Calculate the mass of a single atom of carbon.

.....

.....

77. Does one mole of all the substances have the same mass .

.....

78. How many atoms of each element are there in 9·8 g of H_2SO_4 ?

.....

.....

.....

OBJECTIVE TYPE QUESTIONS

79. Fill in the blanks :

(*a*) 1/12 of the mass of one atom of C-12 is known as.....

(*b*) The crystals of ferrous sulphate are.....in colour.

(*c*) Metals are obtained from their oxides by.....reactions.

(*d*) Proteins get decomposed into.....

(*e*) A.....is the chemist unit for counting atoms,.....or.....

(*f*) A collection of $6{\cdot}023 \times 10^{23}$ atoms is known as.....

(*g*) The modern standard for relative atomic mass is.....

(*h*) The symbolic representation of a chemical change is called.....

(*i*) Electrolysis of water is.....type of reaction.

(*j*) In a chemical equation reactants are separated from products by an.....

80. Write true or false against each of the following statements :

(*a*) All chemical reactions involve making and breaking of bonds. ( )

(*b*) The numerical value of Avogadro's number is $6{\cdot}023 \times 10^{23}$. ( )

(*c*) 5 moles of water weigh 90 g. ( )

(*d*) CaO reacts with water to form slaked lime. ( )

(*e*) O_2 is oxidised and H_2 is reduced in the formation of H_2O. ( )

81. Match the items in Column-I with those in Column-II.

Column-I	*Column-II*
(*a*) Shorthand representation of reaction	$6{\cdot}023 \times 10^{23}$
(*b*) Avogadro's number	$\rightleftharpoons$
(*c*) Reversible reaction	Chemical equation $\longrightarrow$
(*d*) Formation of precipitate	$\downarrow$
(*e*) Evolution of gas	$\uparrow$

MULTIPLE CHOICE QUESTIONS

82. 1. The molecular mass of CO will be :

(*a*) 12 (*b*) 28 (*c*) 44 (*d*) 16

2. The modern standard for relative atomic mass is :

(*a*) H_2 (*b*) O_2 (*c*) C_{-12} (*d*) C_{-14}

3. The number of moles in 124 g of P is :

(*a*) 1 (*b*) 2 (*c*) 3 (*d*) 4

4. How many moles of methane will be required to obtain 4 moles of H_2O ?

(*a*) 1 (*b*) 1·5 (*c*) 2 (*d*) 2·5

5. The molecular weight of one mole of nitric acid is :

(*a*) 43 (*b*) 53 (*c*) 63 (*d*) 73

6. The atomic mass of an atom of potassium is :

(*a*) 9 (*b*) 19 (*c*) 29 (*d*) 39

7. The heat liberated for every mole of water formed will be :

(*a*) 86 KJ (*b*) 186 KJ (*c*) 286 KJ (*d*) None

83. Provide scientific terms for the following statements :

(*a*) Reaction in which two or more substances combine together.....

(*b*) A reaction which occurs with the evolution of heat.....

(*c*) The process of decomposition of a substance by electric current.....

(*d*) Reaction in which a substance breaks into simpler products.....

(*e*) The symbolic representation of a compound.....

□ □

5

Energy Changes in Chemical Reactions

1. What drives a chemical reaction ?

.....

2. What is an exothermic reaction ?

.....

.....

3. What is an endothermic reaction ?

.....

.....

4. What are thermo-chemical reactions ?

.....

.....

5. What makes a reaction endothermic ?

.....

.....

6. What makes a reaction exothermic ?

.....

.....

7. Is breaking of bond an endothermic reaction ?

.....

8. Name two units of energy.

(*a*) ..... (*b*) .....

9. What is the relationship between a calorie and a Joule ?

.....

10. Write equation for one reaction of industrial importance in which

(*a*) Heat is absorbed .....

(*b*) Heat is produced .....

11. How much heat in KJ per mole is released in the formation of the following compounds ?

(*a*) NaCl ..... (*b*) H_2O .....

(*c*) CO_2 ..... (*d*) NH_3 .....

(*e*) C_4H_{10} ..... (*f*) CH_4 .....

12. (*a*) How will you write methane symbolically ?

.....

(*b*) Calculate its molecular mass in grams.

.....

(*c*) Which will give more heat—Butane or Carbon ?

.....

13. (*a*) Expand the abbreviation L.P.G.

.....

(*b*) State one domestic use of it.

.....

(*c*) What is the main constituent of this gas ?

.....

14. The heat of combustion of carbon is 395 KJ/mole. What is the amount of heat liberated when 1 gram of pure carbon is oxidised to carbon dioxide ?

.....

.....

.....

15. Is charcoal the best fuel to use ? Justify your answer.

.....

.....

16. The heat liberated by 120 g of carbon is used totally to heat 10 litres of water (at 25°C). What will be the final temperature of the water ? (*Hint* : 1 calorie = 4·18 J and the specific heat of water is 1 cal/degree/gram).

.....

.....

.....

17. Nitrogen combines with hydrogen to form ammonia.

$$N_2 + 3H_2 \longrightarrow 2NH_3 + 92\ KJ$$

(*a*) What is the heat formation of ammonia per mole ? .....

(*b*) How much heat is needed to decompose 70 g N_2 ? .....

18. The heat of combustion of methane is 890 KJ/mole. What amount of heat will be liberated by the complete oxidation of 80 g methane ?

.....

.....

19. What are photochemical reactions ?

.....

.....

20. Mention two chemical reactions which can be brought about by means of light energy.

(*a*) .....

(*b*) .....

21. Name two processes which involve photochemical reactions.

(*a*) ..... (*b*) .....

22. (*a*) Which type of reaction takes place in photography ?

.....

(*b*) Name the compound which is present in the photographic film.

.....

23. Name two pollutants produced from exhaust fumes of automobiles.

(*a*) ..... (*b*) .....

24. Define the term 'electrochemistry' in your own words.

.....

.....

25. Explain the term 'electrolysis' with the help of an example.

.....

.....

.....

.....

26. What is an anion ?

.....

.....

27. What is an anode ?

.....

28. What is a cation ?

.....

.....

29. What is a cathode ?

.....

30. What is an electrolyte ?

.....

31. Describe and draw a neat labelled diagram of an electrolytic cell.

.....

.....

.....

.....

32. Molten sodium chloride is electrolysed using carbon electrodes.

(*a*) Which element is liberated at the anode ? : .....

(*b*) Which element is liberated at the cathode ? : .....

(*c*) Write down the electrode reactions ; .....

33. Give one example of a reaction which is brought about by applying electric current.

.....

34. Write the names of four metals which are extracted by electrolysis.

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

35. What happens when molten sodium chloride is electrolysed. Write chemical reactions only.

.....

.....

36. What is an electrochemical cell ?

.....

.....

.....

37. (*a*) Who discovered that electricity can be produced by a chemical reaction ?

.....

(*b*) What is the contribution of Luigi Galvani ?

.....

(*c*) Which cell is named in his honour ?

.....

38. Draw a diagram of a Galvanic cell. Mark the anode and the cathode. Show the direction of flow of electrons. Write equation of the reactions taking place at the two electrodes, anode and cathode.

.....

.....

.....

.....

39. When a copper metal rod is immersed in a silver nitrate solution, copper ions start appearing in the solution and silver metal gets deposited on the rod.

(*a*) Can the copper rod be regarded as an electrode ? .....

(*b*) If, so, is it an anode or a cathode ? .....

40. What do you understand by 'Reactivity series of metals' ?

.....

.....

41. Arrange the following metals in the increasing order of their reactivity :

Hg, Au, Fe, Pb, H, Al, Mg, Na, Ag, Zn.

.....

42. Which of the two is more reactive—Zn or Cu ? Give reason for your answer.

.....

.....

43. Which of the following are below copper in the activity series of metals :

Fe, H, Ag, Zn, Hg

.....

44. Name a non-metal which has been placed in the activity series of metals.

.....

45. Write ionic equation of the reaction which occurs when a piece of zinc is placed in a solution of copper sulphate.

.....

.....

46. Why do most of the metals occur in nature in the form of ionic compounds ?

.....

.....

47. Name two metals which occur in nature :

(*a*) in the metallic state : .....

(*b*) in the combined state : .....

48. (*a*) Who invented dry cell ? : .....

(*b*) Where are these cells used ? : .....

(*c*) What is its voltage ? .....

49. What is the contribution of G. Leclanche ?

.....

50. What is the advantage of dry cell over other cells ?

.....

.....

51. Draw a labelled diagram to show the structure of a dry cell.

52. State one function of each of the following in a dry cell.

(*a*) Zinc container : .....

(*b*) Carbon rod with a brass cap : .....

53. Describe Leclanche cell in your own words.

.....

.....

.....

.....

54. Which metal is used for making the cathode and container of dry cell ?

.....

55. What is the main disadvantage of most of the electrochemical cells ?

.....

56. (*a*) What are storage cells ?

.....

.....

(*b*) What are the other names of this cell ?

.....

(*c*) What are its advantages over dry cells ?

.....

57. Which type of storage cell is used in automobiles for ignition and lighting ?

.....

58. Name two other varieties of :

(*a*) Dry cells : .....

(*b*) Storage cells : .....

59. Draw a labelled diagram showing the structure of lead-acid accumulator (storage cell).

.....

.....

.....

.....

60. For what purpose are the cells of the lead-acid type commonly used and why ?

.....

.....

61. Write two precautions which one should observe while charging the accumulators :

(*a*) .....

(*b*) .....

62. What do you mean by the term 'rusting of iron' ?

.....

.....

63. Under what conditions will iron rust ?

.....

64. Which metal should be coated over an iron surface to protect it from rusting ?

.....

65. (*a*) What is Galvanisation ?

.....

(*b*) Which metal is used for Galvanisation ?

.....

(*c*) Why is it done ?

.....

(*d*) Name two Galvanised articles known to you.

.....

(*e*) Do you know why the word Galvanised is used here ?

.....

(*f*) Expand the abbreviation G. I.

.....

66. Which would occur more readily in nature as the metal and which as the ion : Zinc or Gold ?

.....

67. How is Coulomb related to amperes ?

.....

68. Answer the following questions with reference to lead storage cell :

(*a*) What is anode made of ? .....

(*b*) What is cathode made of ? .....

(*c*) Name the electrolyte .....

69. Define Faraday's first law in your own words.

.....

.....

70. What is the formula to calculate the amount of metal deposited during electrolysis ?

.....

71. A current of 2 amperes was passed through a solution of copper sulphate for an hour. How many Coulombs were used up ? (Coulomb ampere × time in seconds)

.....

.....

72. How many Faradays are released when 12·91 g of copper sulphate is changed into copper ions. (Equivalent weight of Cu=31·5).

.....

.....

.....

73. Calculate the amount of copper deposited from a solution of copper sulphate when a current of 0·25 amperes was passed for two hours.

.....

.....

.....

74. A current of 10 amperes was passed through a sodium chloride solution for a period of 20 minutes. How many Coulombs were used up. How many grams of sodium metal was obtained ?

.....

.....

.....

.....

75. A current of 3 amperes strength was passed through silver nitrate solution for 30 minutes which deposited 4 grams of silver on the cathode. Calculate the electro-chemical equivalent of silver.

.....

.....

.....

OBJECTIVE TYPE QUESTIONS

76. Fill in the blanks :

(*a*) The ..... is the unit of electrical charge.

(*b*) A flow of ..... constitutes an electric current.

(*c*) Nickel-iron and nickel-cadmium are ..... cells.

(*d*) ..... and ..... cells are varieties of dry cells.

(*e*) The ..... metal can displace the ..... metal from the solution.

(*f*) ..... energy is converted into ..... energy in a electrochemical cell.

(*g*) The positive and negative electrodes are called ..... and .....

(*h*) Photography and photosynthesis are ..... reactions.

(*i*) Butane is the main constituent of ..... gas.

(*j*) An exothermic reaction ..... energy.

77. Are the following statements true or false ?

(*a*) Storage cell can be discharged and recharged number of times. (.....)

(*b*) Dry cell gives a steady flow of electrons at 1·5 Volts. (.....)

(*c*) Mercury is more reactive than iron. (.....)

(*d*) Electrochemical cell is also called Galvanic cell. (.....)

(*e*) Storage cells are also called accumulators. (.....)

(*f*) Electrolysis is a photochemical reaction. (.....)

(*g*) The formation of ammonia involves expenditure of energy. (.....)

(*h*) 4·2 Joules is equal to 1 Calorie. (.....)

(*i*) Gold and silver form ionic compounds easily. (.....)

(*j*) The inner contents of a dry cell are moist. (.....)

78. Match the items in Col umn I with those in Column II.

Column I	*Column II*
(*a*) Positively charged electrode	A dry cell
(*b*) Negatively charged electrode	Storage cell
(*c*) Leclanche cell	Anode
(*d*) Secondary cell	Cathode
(*e*) Electrochemical cell	Leclanche
	Galvani

79. Multiple Choice Questions :

1. Which of the following act as anode in a dry cell ?

(*a*) Zinc (*b*) Brass cap (*c*) Carbon rod (*d*) MnO_2.

2. The main advantage of dry cell over other cell is :

(*a*) Compact size (*b*) Light weight (*c*) Portable (*d*) All of them.

3. Which of the following cell can be recharged ?

(*a*) Silver cell (*b*) Lead acid cell (*c*) Lithium cell (*d*) Dry cell.

4. Which of the following metal occurs in nature in free form ?

(*a*) Fe (*b*) Au (*c*) Zn (*d*) Al.

5. The heat of formation of CO_2 is :

(*a*) 46 KJ (*b*) 395 KJ (*c*) 890 KJ (*d*) None.

6. MnO_2 in a dry cell act as :

(*a*) Electrolyte (*b*) Depolazier (*c*) Cathode (*d*) Anode.

7. The relative density of acid in a fully charged storage cell is :

(*a*) 1 (*b*) 1·10 (*c*) 1·15 (*d*) 1·25.

8. Electromotive force of a fully charged lead storage cell is :

(*a*) 1·8 V (*b*) 1·9 V (*c*) 2 V (*d*) 2·1 V.

9. Which metal is more reactive than Magnesium ?

(*a*) Al (*b*) Zn (*c*) Na (*d*) Cu.

10. The value of one Faraday in Coulomb is :

(*a*) 965 (*b*) 9650 (*c*) 965000 (*d*) 96500,

□ □

6

Describing Motion

1. (*a*) What is motion ?

.....

.....

(*b*) Give four examples of bodies in motion.

(*i*) ..... (*ii*) ..... (*iii*) ..... (*iv*) .....

2. What is uniform motion ? Give three examples.

.....

.....

.....

3. What is non-uniform motion ? Give three examples.

.....

.....

.....

4. Define the term 'speed' in your own words.

.....

.....

5. A body covers a distance s in time t. What is its speed v ?

.....

6. What will be the unit of speed, if the distance is measured in metres and time in seconds ?

.....

7. What are the other units of speed in common use ?

(*a*) ..... (*b*) ..... (*c*) .....

8. Define average speed.

.....

.....

9. What do you understand by 'uniform speed' ?

.....

.....

10. Distinguish between speed and velocity.

Speed	*Velocity*
(*a*)	.....
(*b*)	.....

11. What instrument do we use for measuring instantaneous speed of a vehicle ?

.....

12. How will you define the term 'displacement' in minimum words ?

.....

13. The displacement of a body is described in terms of two quantities. What are they ?

.....

14. Will the displacement of a body change if there is any change in either its magnitude or direction or both ?

.....

15. What is a vector quantity ? Give two examples.

.....

.....

16. What is a scalar quantity ? Give two examples.

.....

.....

17. Displacement is a vector quantity. What do you mean by this statement ?

.....

.....

18. What is the difference between distance and displacement ?

.....

.....

19. Define the term 'velocity' in your own words.

.....

.....

20. How is velocity defined in terms of displacement ?

.....

.....

21. What will be the unit of velocity if displacement is measured in metres and time in seconds ?

.....

22. State three other units of velocity in common use.

(*a*) ..... (*b*) ..... (*c*) .....

23. Is velocity a scalar or a vector quantity ? Justify.

.....

.....

24. What is rectilinear motion ?

.....

.....

25. What is acceleration ?

.....

.....

26. Distinguish between uniform and non-uniform velocity.

.....

.....

27. What is the difference between uniform linear motion and uniform circular motion ?

	Uniform linear motion	*Uniform circular motion*
(*a*)	.....	.....
(*b*)	.....	.....

28. Is acceleration a vector or a scalar quantity ? Explain.

.....

.....

29. What does the speedometer of a car tell you ?

.....

30. What is uniform acceleration ? Give one example.

.....

.....

31. Define circular motion.

.....

.....

32. (*a*) How will you define angular velocity ?

.....

.....

(*b*) What is the basic unit of angular velocity ?

.....

33. State whether the following are scalar or vector quantities :

(*a*) Displacement : ..... (*b*) Speed : .....

(*c*) Velocity : ..... (*d*) Acceleration : .....

34. Convert a speed of 1 km/h in :

(*a*) m/s : .....

(*b*) cm/s : .....

35. Define the 'displacement-time' graph and 'velocity-time' graph.

(*a*) .....

.....

(*b*) .....

.....

36. What does the slope of a velocity-time graph indicate ?

.....

.....

37. What can you say about the motion of a body if its :

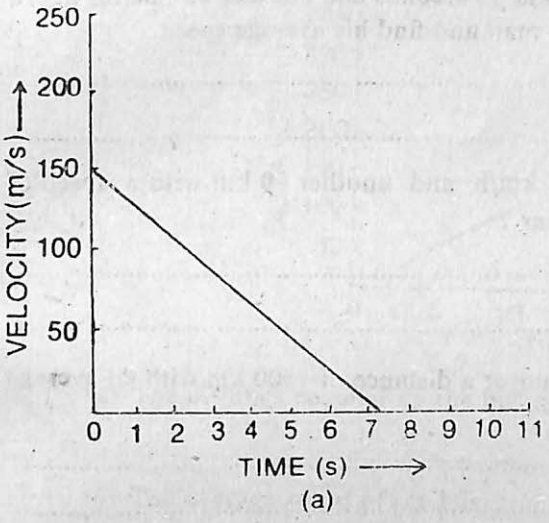
(*a*) Time-displacement graph is a straight line ?

.....

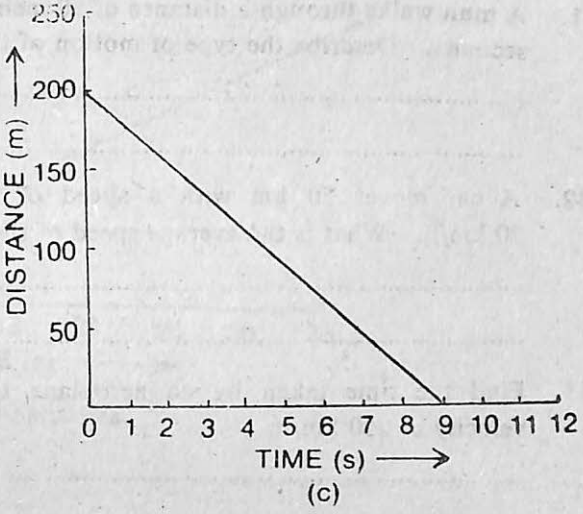
(*b*) Time-velocity graph is a straight line ?

.....

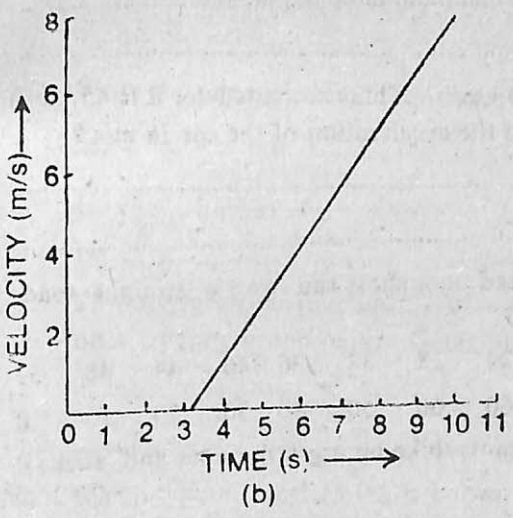
38. What type of motion is represented by each of the following graphs ? Comment on each.



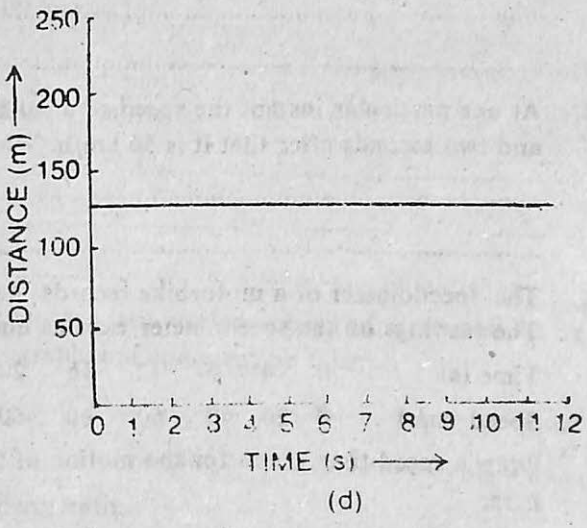
(a)



(c)



(b)



(d)

39. How long will a car take to travel a distance of 400 km if its speed is 50 km/h ? (Hint : $d = s \times t$).

.....

.....

40. Rajdhani Express takes 20 hours to reach Calcutta from Delhi. If it travels at 70 km/h, how far is Calcutta from Delhi ?

.....

.....

41. A man walks through a distance of 50 metres in 15 seconds and another 50 metres in 10 seconds. Describe the type of motion of the man and find his average speed.

.....

.....

42. A car moves 50 km with a speed of 25 km/h and another 60 km with a speed of 20 km/h. What is the average speed of the car ?

.....

.....

43. Find the time taken by an aeroplane to cover a distance of 1500 km with an average velocity of 250 km/h.

.....

.....

44. A train maintains a constant speed of 60 km/h. Find the speed in m/s.

.....

.....

45. At one particular instant the speed of a car is 40 km/h. Three seconds later it is 45 km/h and two seconds after that it is 50 km/h. What is the acceleration of the car in m/s ?

.....

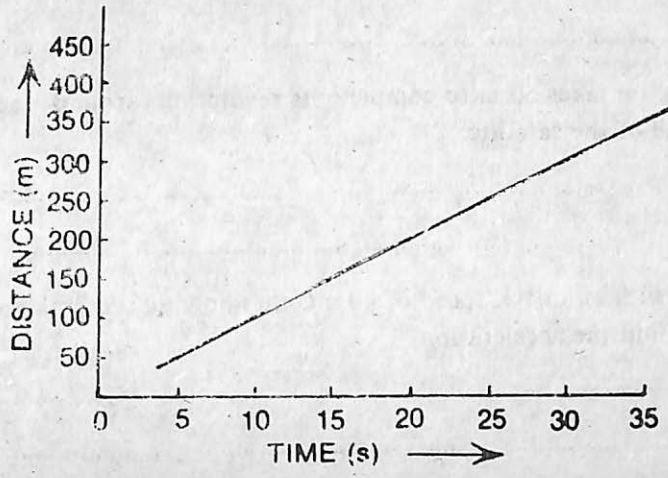
.....

46. The speedometer of a motorbike records its speed on a short run over a straight road. The readings on the speedometer were as under :

Time (s)	0	4	8	12	16	20	24	28	32	36	40	44	48	52
Speed (m/s)	0	20	40	60	60	60	60	60	50	40	30	20	10	0

Draw a speed-time graph for the motion of the motorbike on a graph-paper and stick it here.

47. Following graph shows the motion of a bus between Delhi and Solan. From this graph find :



(*a*) The distance covered by the bus in 30 seconds.

.....

(*b*) The average speed of the bus.

.....

(*c*) Time taken to cover a distance of 200 metres.

.....

48. Write the expressions of the three equations of motion.

(*a*) .....

(*b*) .....

(*c*) .....

49. Plot displacement-time graphs of bodies moving with uniform speed of 5 m/s and 10 m/s on a separate graph paper. Compare the graph and comment on them.

.....

.....

50. Which type of acceleration is known as deceleration ?

.....

.....

51. An athlete before throwing a hammer, whirls it in a circle. Is the motion uniform or accelerated ?

.....

52. A car attains a speed of 15 m/s in 15 s, starting from rest. Calculate the acceleration of the car.

.....

.....

53. An artificial satellite takes 50 m to complete its revolution around the earth. Calculate the angular speed of the satellite.

.....

.....

54. A truck moving with an initial speed of 40 m/s on applying the brakes comes to rest after travelling 8 m. Find the acceleration.

.....

.....

55. An object with an initial velocity of 50 cm/s has an acceleration of 5 cm/s^2. In how much time will it cover 240 cm ?

.....

.....

.....

56. A rocket starting from the ground reaches a speed of 34560 km/h in 2 m. Find its average acceleration in m/s^2.

.....

.....

.....

57. A cricket ball falls freely through 1 m in 0·45 s. What is the acceleration due to gravity ?

.....

.....

.....

58. A car increases its velocity from 40 m/s to 44 m/s in 0·2 s. What is its acceleration ?

.....

.....

59. A scooter is racing at a speed of 72 km/h. Find the angular speed of the wheels if the radius of each wheel is 20 cm.

.....

60. A car travels at 45 km/h. It is brought to rest with uniform retardation in 30 s. Calculate the deceleration of the car.

61. A man is rowing a boat with a velocity of 6 km/h in a river, flowing with a velocity of 3 km/h. What would be the magnitude and direction of the resultant velocity of the boat with respect to the bank of the river, if the man rows :

(*a*) In the direction of the flow :

(*b*) Opposite to the direction of the flow :

62. A body is moving uniformally in a straight line with a velocity of 5 km/s. Find the distance covered by it in 5 s.

63. A scooter acquires a velocity of 36 km/h in 5 s just after the start. Calculate the acceleration of the scooter.

64. Find the initial velocity of a train which is stopped in 20 s by applying brakes. The retardation due to brakes is 1·5 m/s^2.

65. A bus starting from rest moves with a uniform acceleration of 0·12 m/s^2 for 2 m. Find the speed acquired and the distance travelled.

66. What is the meaning of the term 'instantaneous velocity' ?

.....

.....

67. (*a*) What do you mean by resultant velocity ?

.....

.....

(*b*) How is it determined ?

.....

.....

68. What the value of the acceleration of a freely falling body ?

.....

OBJECTIVE TYPE QUESTIONS

69. Fill in the blanks :

(*a*) Motion along a straight line is called.....motion.

(*b*) A negative acceleration is called.....

(*c*) The rate of change of velocity of a body is called.....

(*d*) .....is represented by a Greek letter omega (ω).

(*e*) Vector quantities have both.....and.....

(*f*) Speed is a.....quantity.

(*g*) Slope of distance-time graph gives the.....of the body.

(*h*) The change of position of an object is called its.....

(*i*) The maximum speed of a cheetah is.....

(*j*) Distance-time graph is not a straight line in.....motion.

70. Write true or false against each of the following statements :

(*a*) Circular motion is an accelerated motion. (.....)

(*b*) Angular velocity has the units of rad/s. (.....)

(*c*) Acceleration is a scalar quantity. (.....)

(*d*) The velocity-time graph for uniform acceleration is a straight line. (.....)

(*e*) The value of acceleration due to gravity is 9·83 m/s^2. (.....)

(*f*) Resultant velocity is determined by the law of addition of two vectors. (.....)

(*g*) The magnitude of velocity is speed. (.....)

(*h*) Linear speed = Angular speed × radius of the circular path. ( )

(*i*) The slope of velocity-time graph gives speed. ( )

(*j*) The unit of acceleration is m/s. ( )

71. Provide scientific terms for each of the given statements :

(*a*) Quantities which have both magnitude and direction.....

(*b*) Motion of a body along a straight line.....

(*c*) The rate of change of velocity of a body.....

(*d*) The rate of change of velocity with time.....

(*e*) The rate of change of displacement with time.....

(*f*) The rate of change of distance with time.....

MULTIPLE CHOICE QUESTIONS :

72. 1. In the case of rectilinear uniform motion distance-time graph is a :

(*a*) Parabola (*b*) Straight line (*c*) Hyperbola (*d*) Curved line

2. If a body covers equal distance in equal interval of time, its motion is called :

(*a*) Uniform motion (*b*) Non-uniform motion (*c*) Acceleration (*d*) None

3. A man is cycling at the rate of 18 Km/h. Its speed in m/s is :

(*a*) 5 (*b*) 10 (*c*) 15 (*d*) 18

4. A car starts from rest and covers a distance of 50 m in one s with uniform acceleration. Its acceleration is :

(*a*) 10 m/s^2 (*b*) 20 m/s^2 (*c*) 50 m/s^2 (*d*) 75 m/s^2

5. The motion of the earth around the sun is :

(*a*) Uniform motion (*b*) Accelerated motion (*c*) Deceleration (*d*) None

6. The unit of velocity is the same as that of :

(*a*) Distance (*b*) Displacement (*c*) Speed (*d*) Acceleration

7. Which of the following is a vector quantity ?

(*a*) Area (*b*) Length (*c*) Velocity (*d*) Mass

8. Which of the following is the unit of angular velocity ?

(*a*) Km/h (*b*) m/s^2 (*c*) rad/s (*d*) m/s

9. The rate of change of displacement with time is termed :

(*a*) Speed (*b*) Displacement (*c*) Velocity (*d*) Acceleration

10. The rate of change of velocity with time is known as :

(*a*) Distance (*b*) Displacement (*c*) Acceleration (*d*) Deceleration

□□

7

Force and Acceleration

1. What is meant by force ?

.....

.....

2. What can happen when you apply a force on an object ?

(*a*) .....

(*b*) .....

(*c*) .....

3. If an object is to accelerate, what must act on the object ?

.....

4. Give two examples in which a force changes the velocity of an object.

(*a*) .....

(*b*) .....

5. Give two examples in which a force stops a moving object.

(*a*) .....

(*b*) .....

6. Write two examples in which a force changes the direction of the moving body.

(*a*) .....

(*b*) .....

7. Mention two examples in which a force changes the shape of an object.

(*a*) .....

(*b*) .....

8. Name two factors on which the effect produced on an object by an applied force depends.

(*a*) ..... (*b*) .....

9. What is meant by 'the line of action of force' ?

.....

.....

10. Is force a vector quantity or a scalar quantity ? Justify your answer.

.....

.....

11. What do you understand by the resultant force ?

.....

.....

12. What formula would you use to calculate the resultant of two forces when they act simultaneously :

(*a*) At right angle to each other. .....

(*b*) In a straight line in the same direction. .....

(*c*) In a straight line in the opposite direction. .....

13. (*a*) What is the unit in which a force is measured ? .....

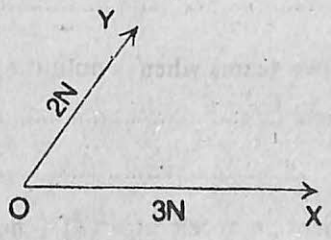
(*b*) What is a 'unit force' ? .....

(*c*) Define Newton. .....

(*d*) How many Newtons make one kilogram weight ? .....

(*e*) Define Dyne in your own words. .....

14. In the diagram given below one unit of length represents a magnitude of 3 Newtons. The arrows OX and OY represents two forces acting simultaneously on an object placed at point O.



(*a*) Draw the resultant force in the diagram. .....

(*b*) What is the magnitude of the resultant force ? .....

(*c*) What is the direction of the resultant force ? .....

15. A book is placed on a level table and remains there at rest.

(*a*) What are the forces acting on the book in this case ?.....

(*b*) Are all the forces balanced ? .....

(*c*) What will happen if the book was given a small push along the table ? .....

.....

(*d*) What forces would be acting on the book in this case ? .....

16. What are balanced forces ?

.....

.....

17. How does an object behave under the action of balanced forces ? Give an example.

.....

.....

18. What are unbalanced forces ?

.....

.....

19. What is the effect of unbalanced forces on an object ? Give an example.

.....

.....

20. Give two examples in which two equal and opposite forces acting on an object bring about a change in its shape, without any change in its position.

(*a*) .....

(*b*) .....

21. In a Tug-of-War between the two teams when would the rope :

(*a*) Not move in any direction .....

(*b*) Move on either side .....

22. What is the force which produces an acceleration of 1 m/s^2 in a body of mass 1 kg. ?

.....

23. (*a*) What is frictional force ?

.....

(*b*) What are its causes ?

.....

(*c*) Name two factors which affect the magnitude of the force of friction :

(*i*) ..... (*ii*) .....

24. State two ways in which friction is advantageous for us.

(*a*) .....

(*b*) .....

25. State two ways in which friction is disadvantageous for us.

(*a*) .....

(*b*) .....

26. Give two ways by which friction can be reduced.

(*a*) .....

(*b*) .....

27. (*a*) Who gave us Laws of Motion ? .....

(*b*) How many Laws of Motion are known to you ? .....

28. (*a*) State 'Newton's First Law of Motion'.

.....

.....

(*b*) Why is this law also called Law of Inertia ?

.....

.....

(*c*) In whose honour Newton's First Law is known as Law of Inertia ?

.....

29. (*a*) Define the Law of Inertia.

.....

.....

(*b*) Define the term 'inertia' with respect to :

(*i*) Rest

.....

.....

30. How are mass and inertia related ?

31. Explain why it is dangerous to jump out of a moving train.

32. Explain why person sitting in a bus falls backward if the bus suddenly starts ?

33. A loaded and an empty bus are moving with equal speeds. Which one is easier to stop by applying the brakes ? Why ?

34. Why do passengers fall on the side when the bus takes a sharp turn ?

35. It is usual for the long jump athletes to run before taking a leap. Why do they do that ?

36. Why do the fruits of a tree fall down on shaking it ?

37 Why can carpets and other heavy clothes be cleaned of dust by beating or shaking them ?

.....

.....

.....

38 A coin is placed on a postcard which in turn is kept on an empty tumbler. What happens to the coin when the postcard is pulled suddenly ?

.....

39. Which of the two will have more inertia ?

(*a*) A football and a gourd of the same size .....

(*b*) An eraser and a pencil .....

(*c*) Geometry box and your lunch box .....

(*d*) Rubber ball and a cricket ball .....

(*e*) An apple and an orange .....

40. State 'Newton's Second Law of Motion'.

.....

.....

41. How does the acceleration imparted to a body by an unbalanced force applied to it depend upon :

(*a*) The force

.....

(*b*) The mass of the body

.....

42. Derive relationship between force, mass and acceleration using Second Law of Motion.

.....

.....

43. Which Law of Motion give the measure of force ?

.....

44. What is meant by the term 'momentum' ?

.....

.....

45. Is momentum a vector quantity ? Support your answer.

.....

.....

46. What is the unit of momentum ?

.....

47. Why would a big train moving slowly have more momentum than a fast moving bullet ?

.....

.....

48. Why does a cricket player while catching a fast ball moves his hands backwards ?

.....

.....

49. The guard of a train runs some distance before boarding a train in motion. Why ?

.....

.....

.....

50. Name two factors on which the momentum of a body depends.

(*a*) ..... (*b*) .....

51. State Newton's 'Third Law of Motion.'

.....

.....

52. Why Newton's Third Law of Motion is also called 'Action-Reaction Law' ?

.....

.....

53. Indicate the action and reaction in each of the following cases :

(*a*) A ship floating on still water .....

(*b*) A boy standing on the ground .....

(*c*) A stone suspended with a thread .....

(*d*) Two teams of girls pulling a rope in a tug-of-war.....

54. Do action and reaction act on the same body or different bodies ?

.....

55. When a person jumps out of the boat the person moves forward whereas the boat moves backwards. Why ?

.....

.....

.....

56. From which Law of Motion we obtain the concept of the property of inertia ?

.....

57. How can two forces of 6 N and 8 N combine to give forces of :

(*a*) 14 N .....

(*b*) 2 N .....

(*c*) 10 N .....

58. Calculate the acceleration produced in the following cases :

(*a*) Force of 24 N acting on a body of mass 12 kg.

.....

.....

(*b*) Force of 50 N acting on a body of mass 10 kg.

.....

.....

(*c*) Force of 48 N acting on a body of mass 6 kg.

.....

.....

59. Calculate the force needed to produce an acceleration of $5 m/s^2$ and $8 m/s^2$ in a body of mass 4 kg.

.....

.....

60. Find out the resultant of two forces 12 N and 5 N acting at right angle to each other by using the formula.

.....

.....

.....

61. Plot a graph between acceleration, a, and mass, m, for a given force F (Take $F = 100$ N) for the values given below on the graph paper. From the graph find the values of 'a' for various values of mass, m, and fill the table.

Mass, m, (kg.)	10	50	100	150	200	250	300	350	400	450	500
Acceleration, 'a'	...	...	...	...	...	...	...	...	...	...	...

62. Find the force acting when a body of 10 kg mass gets accelerated at 4 m/s^2.

.....

.....

63. What is the magnitude of the force which when acts on a mass of 1·5 kg, gives it a velocity of 5 m/s in one minute ?

.....

.....

.....

64. A driver accelerates a car first at the rate of 2·5 m/s^2 and then at the rate of 3·5 m/s^3. Calculate the ratio of the force exerted by the engine in the two cases.

.....

.....

65. A body of mass 5 kg. is moving with a velocity of 10 m/s. A force is applied so that in 20 s it attains a velocity of 30 m/s. Calculate the value of the force applied.

.....

.....

.....

66. Find the resultant of two forces 10 N and 24 N acting at right angle to each other.

.....

.....

67. Calculate the momentum of a ball of mass 200 g. moving with a velocity of 20 m/s.

.....

.....

68. Calculate the force required to give a toy car of mass 0·2 kg. and acceleration of 0·5 m/s^2

.....

.....

69. What is the momentum of a man of mass 65 kg. when he walks with a uniform velocity of 2 m/s ?

.....

.....

70. An object of mass 5 kg. is accelerated by 4 m/s² from east to west. How large is the force and in which direction it act ?

.....

.....

.....

71. How long would a force of 30 N act on a body of mass 5 kg. so that body gains a velocity of 12 m/s.

.....

.....

.....

72. Which would require a greater force-accelerating a 10 g. mass at 5 m/s² or 20 g. mass at 2 m/s² ?

.....

.....

OBJECTIVE TYPE QUESTIONS :

73. Fill in the blanks:

(*a*) Momentum is a .....quantity.

(*b*) The inertia of a body.....with an increase in its mass.

(*c*) .....is defined as the product of mass and velocity.

(*d*) To every action there is.....and.....reaction.

(*e*) The unit of.....is Newton.

(*f*) One Newton force produces an acceleration of.....in a body of mass.....

(*g*) .....Law of inertia is also called.....Law.

(*h*) .....Objects have more inertia than.....objects.

(*i*) Force=.....×.....

(*j*) .....forces produces change in the state of motion of a body.

74. State whether the following statements are true or false ?

(*a*) A force changes the velocity of an object. ( )

(*b*) Force is a scalar quantity. ( )

(*c*) The inertia of an object is a measure of its mass. ( )

(*d*) Action and reaction act on different bodies. ( )

(*e*) In an unbalanced force, resultant force is zero. ( )

(*f*) A balanced force changes the shape of the object when applied. ( )

(*g*) Newton's First Law helps us to measure force. ( )

(*h*) The tyres of vehicles are made rough to increase friction. ( )

(*i*) Force of friction acts only between bodies in contact. ( )

(*j*) Inertia is the property of objects to resist any change in motion. ( )

75. Provide scientific terms for each of the following statements :

(*a*) A line drawn through the point of application of the force.....

(*b*) Forces which just balance and produce no motion.....

(*c*) To every action there is an equal and opposite reaction.....

(*d*) The force which produces an acceleration of 1 m/s^2 in 1 kg. mass.....

(*e*) The property of the objects to resist change in their motion.....

76. Match the items in Column-I with those in Column-II :

Column-I	*Column-II*
(*a*) Momentum	Newton
(*b*) Force	Unchanging
(*c*) Inertia	Newton's First Law
(*d*) Galileo	Action-Reaction Law
(*e*) Newton's Third Law	Mass × Velocity
	Kilogram Weight

77. Choose the right answers in the following :

1. The product of mass and velocity is called :

(*a*) Momentum (*b*) Velocity (*c*) Acceleration (*d*) Force

2. The unit of force is :

(*a*) Newton (*b*) Metre (*c*) Kg. (*d*) N/m

3. Swimming is possible on account of Newton's :

(*a*) First Law (*b*) Second Law (*c*) Third Law (*d*) None

4. The unit of momentum is :

(a) N/s (b) N (c) m/s (d) kg/s

5. The force which produces an acceleration of 1 m/s^2 in a body of 1 Kg mass is :

(a) 1 N (b) 2 N (c) 3 N (d) 4 N

6. Newton's First Law gives concept of :

(a) Inertia (b) Momentum (c) Acceleration (d) Force

7. Inertia of a body has direct dependence on :

(a) Mass (b) Velocity (c) Force (d) Momentum

8. The force needed to produce an acceleration of 4 m/s^2 on a ball of mass 6 kg. is :

(a) 2·4 N (b) 12 N (c) 1·2 N (d) 24 N

9. The momentum of a ball of mass 10 kg. moving with a velocity of 15 m/s is :

(a) 50 kg/s (b) 100 kg/s (c) 150 kg/s (d) 200 kg/s

10. A force acts on an object which is free to move. If we know the magnitude of the force and the mass of the object, Newton's Second Law of Motion enables us to find the objects :

(a) Weight (b) Speed (c) Acceleration (d) Position

□□

8

Gravitation

1. Name four kinds of forces that you come across in your daily life.

   (*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

2. Explain the meaning of the term 'force of gravity'. Give two examples.

   .....

   .....

   .....

3. (*a*) Who proposed the Law of Gravitation ?

   .....

   (*b*) State the Law of Gravitation in your own words.

   .....

   .....

   (*c*) Why is it called Universal Law of Gravitation ?

   .....

   .....

4. In what direction does the force of gravitation act ?

   .....

5. Name two factors on which the force of gravitation depends.

   (*a*) ..... (*b*) .....

6. How does the force of gravity depend upon the distance between the two objects ?

   .....

7. If the distance between the two objects A and B is doubled, what will happen to the force between them ?

   .....

8. If the distance between the two objects A and B is reduced to 1/2, what will happen to the force between them ?

.....

9. (*a*) Which fundamental force holds the planets in their orbits around the sun and also keep the satellites in their orbits around the planets ?

.....

(*b*) State four more practical uses of this force.

(*i*) .....

(*ii*) .....

(*iii*) .....

(*iv*) .....

10. How does the force of gravity related to the masses of the two objects.

.....

11. Explain the term 'acceleration due to gravity' with an example.

.....

.....

12. All objects near the surface of earth have a tendency to fall towards it. Why ?

.....

.....

13. What formula would you use to calculate the force of gravity ?

.....

14. Deduce an expression for the acceleration due to gravity in terms of mass of the earth 'M' and the radius of the earth 'R'.

.....

.....

15. In which direction does the acceleration due to gravity act ?

.....

.....

16. How does the value of acceleration due to gravity changes with :

(*a*) At the top of the mountain.....

(*b*) Down in a mine.....

(*c*) At the equator.....

(*d*) At the North Pole.....

17. Does the value of acceleration due to gravity depend upon the mass of the body on which the force of gravity acts ?

.....

18. (*a*) What is 'g' ?

.....

(*b*) In what unit, is it measured ?

.....

19. (*a*) What is the symbol of Gravitational constant ?

.....

(*b*) Why is it called a universal constant ?

.....

20. (*a*) What is 'G' ?

.....

(*b*) In what unit is it measured ?

.....

21. Why does the value of Gravitational force remains constant ?

.....

.....

22. State two differences between '*g*' and '*G*'.

	'*G*'	'*g*'
(*a*)	.....	.....
(*b*)	.....	.....

23. The earth is acted upon by the gravitational force of attraction of the sun. Why doesn't the earth fall into the sun ?

.....

.....

24. Prove that for a free falling body a=g.

.....

.....

25. Where on the surface of the earth is the value of 'g' :

(*a*) Minimum..... (*b*) Maximum.....

26. (*a*) What do you understand by the mass of a body ?

.....

.....

(*b*) What is the unit to measure it ?

.....

27. (*a*) What is meant by the weight of a body ?

.....

.....

(*b*) Name the unit in which it is measured :

.....

28. What is meant by the inertial mass of an object ?

.....

.....

29. How will you define gravitational mass of an object ?

.....

.....

30. Give three differences between mass and weight :

	Mass	*Weight*
(*a*)	.....	.....
(*b*)	.....	.....
(*c*)	.....	.....

31. What do we measure with :

(*a*) A spring balance..... (*b*) A beam balance.....

32. For each of the experiment mentioned below state whether a spring balance or a beam balance would be more appropriate ?

(*a*) To compare the weights of objects.....

(*b*) To compare the masses of objects.....

33. What are projectiles ? Give one example.

.....

.....

34. (*a*) Can you call moon a projectile ? .....

.....

(*b*) In how many days moon take one revolution around the earth ? .....

.....

35. Why does 5 kg. stone fall with the same acceleration as 2 kg. stone on the earth ?

.....

.....

36. If the force of gravity acts on all bodies in proportion to their masses, why doesn't a heavy body fall faster than a lighter body ?

.....

.....

37. How will you find the value of 'g' when a small object is allowed to fall freely to the ground ?

.....

.....

38. How does the mass and weight vary for an object on the earth and on the moon's surface ?

.....

.....

39. Can a body have mass but no weight ? Why ?

.....

.....

40. What is the value of :

(*a*) g..... (*b*) G.....

41. Name the kind of force operating between two boys sitting in a class room on two different chairs

.....

42. Indicate whether the following are scalar or vector quantities ?

(*a*) Mass..... (*b*) Weight.....

43. A 50 kg. boy stands 1 m away from a 40 kg. girl. Calculate the gravitational force of attraction between them.

.....

.....

.....

44. Calculate the force of gravity by the earth on the moon. (Given : $G=6{\cdot}67\times10^{-11}$ Nm^2/kg^2 ; Mass of the earth$=6\times10^{24}$ kg ; Mass of the moon$=7{\cdot}4\times10^{22}$ kg. ; distance of the moon from the earth$=3{\cdot}84\times10^5$ km.)

.....

.....

.....

.....

45. Calculate the force of gravity due to earth on a 50 kg. girl standing on the surface of the earth. Mass of the earth$=6\times10^{24}$ kg ; Radius of the earth$=6{\cdot}4\times10^3$ km.

.....

.....

.....

46. Would you have more apples for 1 kg. at the poles or at the equator ?

.....

47. Calculate the acceleration due to gravity on the surface of the moon. Prove that it is nearly 1/6th of the gravity of the earth. (Given : Mass of moon$=7{\cdot}4\times10^{22}$ kg ; Radius of the moon$=1740$ km ; $G=6{\cdot}67\times10^{-11}$ Nm^2/kg^2).

.....

.....

.....

.....

48. How much would a 60 kg. man weigh :

(*a*) On the moon..... (*b*) On the earth.....

(*c*) His mass on the earth..... (*d*) His mass on the moon.....

49. The radius of the earth is $6{\cdot}4 \times 10^6$ m. Find its mass (Given : g=9·8 m/s ; G=$6{\cdot}67 \times 10^{-11}$ Nm^2/kg^2).

.....

.....

.....

50. A man throws a ball weighing 0·5 kg. vertically upwards with a speed of 10 m/s. What will be its momentum ? What would be its momentum at the highest point of its flight ?

.....

51. A cricket ball falls freely through 1 m in 0·45 s. What is the acceleration due to gravity ?

.....

.....

.....

52. Calculate the force of attraction between two masses of 1 kg. held in the hands 10 cm apart.

.....

.....

.....

53. What will be the weight of a body which has a mass of 5 kg. ?

.....

.....

.....

54. Two spheres with masses of 5 kg. and 10 kg. respectively are 0·3 m apart. Calculate the force of attraction between them.

.....

.....

.....

55. Two friends of 35 kg. each are sitting at a distance of 1 m from each other. Calculate the force of attraction between them.

.....

56. Calculate the force exerted by the earth on the stone weighing 1 kg. (Given : Mass of the earth $= 6 \times 10^{+24}$ kg. ; Distance between the stone and the earth $= 6{\cdot}5 \times 10^{6}$ m.).

57. What is the value of acceleration due to gravity if a body is :

(*a*) Thrown up..... (*b*) Falls down.....

58. If a ball is dropped from a height of 1 m. How long does it take for the ball to reach the ground ? With what speed will it hit the ground ?

59. We often hear that an astronaut in deep space is weightless. What does this really mean ?

60. A stone is dropped from the edge of the roof. It passes a window 3 m high in 0·1 s. How far is the roof above the top of the window ?

OBJECTIVE TYPE QUESTIONS :

61. Fill in the blanks :

(*a*) .....of gravitation exists between all material bodies.

(*b*) The unit of universal gravitational constant 'G' is.....

(*c*) The spring balance is used for measuring the.....of a body.

(*d*) A beam balance is used for comparing the.....

(*e*) Nm^2/kg^2 is the unit of.....

(*f*) Acceleration due to gravity of falling objects is.....

(*g*) The value of 'g' on the moon is.....that on earth.

(*h*) A force of 2 kg. wt is equal to.....N.

(*i*) .....is the fundamental force which operates in nature.

(*j*) Weight is a.....quantity.

62. State whether the following statements are true or false :

(*a*) The greater the mass of a body the greater its weight. ( )
(*b*) The scale used by fruit vendor is spring balance. ( )
(*c*) The force of attraction between two objects is called gravity. ( )
(*d*) Universal Law of Gravitation was proposed by Galileo. ( )
(*e*) The acceleration of a body thrown up is $-9{\cdot}8$ m/s^2. ( )
(*f*) Gravitational force keeps the planets in their orbits. ( )
(*g*) Weight is the quantity of matter contained in a body. ( )
(*h*) Mass is a vector quantity. ( )
(*i*) The value of 'g' varies with latitude and altitude of a place. ( )
(*j*) The weight of a body is equal to mg. ( )

63. Choose the right answer in the following :

1. The force of gravity between two bodies depend on :
   (*a*) The product of their masses (*b*) The sum of their masses
   (*c*) The difference of their masses (*d*) None
2. The Law of Gravitation was proposed by :
   (*a*) Newton (*b*) Galileo (*c*) Pascal (*d*) Archimedes
3. The force of earth's gravity on an object is known as its :
   (*a*) Weight (*b*) Mass (*c*) Momentum (*d*) Velocity
4. Newton is the unit for measuring :
   (*a*) Mass (*b*) Velocity (*c*) Momentum (*d*) Weight
5. An instrument used for measuring the weight of a body is :
   (*a*) Spring balance (*b*) Beam balance (*c*) Both (*d*) None
6. An astronaut has a weight of 150 N on the surface of earth. After he takes off and lands on the moon his weight shall be :
   (*a*) Zero N (*b*) 15 N (*c*) 25 N (*d*) 150 N
7. A force of 120 N acts on a mass of 60 kg. If no other force acts on the object the acceleration in m/s^2 is :
   (*a*) 0·50 (*b*) 2 (*c*) 18 (*d*) 1·00
8. The value of acceleration due to gravity is :
   (*a*) 9·8 m/s^2 (*b*) 9·8 m/s (*c*) 9·8 cm/s^2 (*d*) 9·8 cm/s
9. Planets revolve around the sun due to force of :
   (*a*) Gravity (*b*) Friction (*c*) Electric (*d*) Magnetic
10. A football kicked by returns to the ground due to force of :
    (*a*) Electric (*b*) Magnetic (*c*) Gravity (*d*) Friction

□□

9

Simple Pendulum and Restoring Force

1. Name four types of motions known to you :

   (*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

2. (*a*) What is meant by a repetitive motion ?

   .....

   .....

   (*b*) Name two repetitive phenomena observed in nature :

   (*i*) ..... (*ii*) .....

   (*c*) Name one repetitive phenomenon which occurs in our body.

   .....

3. (*a*) What is a periodic motion ?

   .....

   .....

   (*b*) Give two examples of periodic motions.

   (*i*) ..... (*ii*) .....

4. All repetitive motions are not periodic but all periodic motions are repetitive. Discuss.

   .....

   .....

   .....

5. (*a*) What are oscillatory motions ?

   .....

   .....

   (*b*) Give an example of an oscillatory motion.

   .....

6. Give two other names of oscillatory motion.

(*a*) ..... (*b*) .....

7. What is the basic principle behind all time measuring devices ?

.....

.....

8. (*a*) What is a simple pendulum ?

.....

.....

.....

(*b*) Define an oscillation.

.....

.....

(*c*) What do we call to the maximum displacement from the mean position in a simple pendulum ?

.....

9. Draw a diagram of a simple pendulum and mark the following in it. The length of pendulum ; Mean position of the pendulum ; amplitude, one Complete oscillation.

10. What is meant by one complete oscillation of a simple pendulum. Indicate it in the diagram of the previous question.

.....

.....

11. Why do the oscillations of an oscillating body die out soon ?

.....

.....

12. What is time period ?

13. A pendulum makes 30 oscillations in 15 s. What is its time period ?

14. Who discovered the principle of pendulum ?

15. (*a*) What is a second's pendulum ?

16. What is the approximate length of a second's pendulum ?

17. Define each of the following terms as applicable to simple pendulum :

(*a*) Length of the pendulum

(*b*) Amplitude

(*c*) Displacement

(*d*) Time period

18. On what factors does time period of a simple pendulum depend ?

19. Does the time period of a pendulum depend upon the mass of the bob ?

.....

20. Why is pendulum choosen as a timing device ?

.....

.....

21. Which pendulum will have more period of oscillation : one with 1 m length or 1·5 m length : .....

22. Explain how period of oscillation depends on the length of a simple pendulum.

.....

.....

23. A pendulum of length 1 m has a time period of 2 s. Calculate the time period if the length is changed to :

(*a*) 2 m .....

(*b*) 0·5 m .....

24. State whether the time period of the pendulum increases, decreases or remain unchanged if :

(*a*) The length of the pendulum is increased

.....

(*b*) The mass of the metallic bob is increased

.....

(*c*) The distance between two extreme position is increased.

.....

25. What do you understand by the term 'frequency of oscillation' ?

.....

.....

26. What is the relationship between the frequency and the time period ?

.....

27. The time of a 20 oscillations of pendulum is measured 5 times with the help of a stop watch. The results are 40·0 s, 39·8 s, 40·1 s, 40·2 s and 39·9 s.

(*a*) What is the average time of 20 oscillations ?

.....

(*b*) What is the time period of oscillation ?

.....

28. What type of motion is performed by a string of sitar when plucked ?

.....

29. The time of 20 oscillations of a pendulum is measured 4 times with the help of a stop clock (least count 0 5 s). The results are : 26 s, 23·5 s, 25 s, 24 s.

(*a*) What is the average time of 20 oscillation ?

.....

(*b*) What is the time period of oscillation ?

.....

30. Name the simplest form of uniform repetitive event.

.....

31. What is the relation between the length of the pendulum and the time period ?

.....

32. A pendulum of 1 m has a time period of 3 s. If the length is increased to 2 m, what would be the time period ?

.....

.....

33. A pendulum of approximately 12·25 cm has a time period of 5 s. If the length is increased to 49 cm what will be its time period ?

.....

.....

34. A simple pendulum is made by attaching a heavy bob to the end of a long wire form a support. What effect would the following changes have on the period of the pendulum ?

(*a*) A shorter wire.....

(*b*) A heavier bob..... .....

(*c*) A hollow bob instead of a solid bob.....

35. Write in mathe natical language the relation between the period of the pendulum (T) and the length of the pendulum (L) ?

.....

36. Find the length of the pendulum whose period is 1 s.

.....

.....

37. When a pendulum is put into a jar containing a liquid, the oscillating pendulum would quickly come to rest. Can you say why ?

.....

.....

38. (*a*) What is the value of pendulum constant ?

.....

(*b*) What is the unit of this constant ?

.....

39. What would be the nature of graph between L and T^2 ?

.....

40. Name two forces acting on the pendulum when the metallic bob is in the mean position.

(*a*) .....(*b*) .....

41. What is the direction of the force responsible for the speeding up or slowing down of the bob as it oscillates ?

.....

.....

42. What is a restoring force ?

.....

.....

43. State two examples of the restoring force from your everyday life :

(*a*) ..... (*b*) .....

44. Why does a swing (Jhoola) in a park quickly stop if some force is not applied ?

.....

.....

45. Give one example that justify that slowing down of oscillation is desirable.

.....

.....

46. Why does the pendulum oscillates ?

.....

.....

47. Will the pendulum oscillate if the pull of the string and the pull of the earth are equal in magnitude ?

.....

48. What would be the period of a pendulum whose length is 9·8 m ?

.....

.....

49. When the period is 2 s and the length of the pendulum is about 99·4 cm. What scientific term would you use for this ?

.....

50. What is the difference between a repetitive and a periodic phenomena ?

.....

.....

51. A simple pendulum of length 25 cm has a time period of 1 s. Calculate the time period if the length is changed to :

(*a*) 50 cm

(*b*) 75 cm

(*c*) 100 cm

52. The values of the length of pendulum (L) and period (T^2) are given below. Draw a graph on the graph paper and stick it here. Explain about the nature of graph.

L (cm)	40	80	120	160	200	240
T^2(s)	1	2	3	4	5	6

OBJECTIVE TYPE QUESTIONS

53. Fill in the blanks :

(*a*) If a pendulum is made shorter its time period.....

(*b*) If the bob of a pendulum is made heavy its time period.....

(*c*) The graph of L against T^2 is a.....

(*d*) Amplitude is the distance between.....and.....position.

(*e*) A change in the amplitude of the pendulum does not change its.....

(*f*) Formation of day and night is an example of natural.....phenomena.

(*g*) Galileo gave us the Principle of.....

(*h*) A simple pendulum makes.....and.....motion about its..... position.

(*i*) The number of oscillations in one second is called.....

(*j*) The basic unit of time is.....

54. Are the following statements true or false ?

(*a*) The longer the pendulum, the greater its time period. ( )

(*b*) The time period of a 1 m long pendulum is 2 s. ( )

(*c*) The movement of a swing is oscillatory. ( )

(*d*) When a spring is stretched and released shows a restoring force. ( )

(*e*) The value of pendulum constant is nearly 24·8 cm/s^2. ( )

(*f*) Period (T^2) is directly proportional to length of the pendulum (L). ( )

(*g*) A pendulum stops oscillating due to force of friction. ( )

(*h*) The principle of pendulum was given by Galileo. ( )

(*i*) The period of a second's pendulum is 1 s. ( )

(*j*) The length of a second's pendulum is approximately 99·4 cm. ( )

55. Match the items in Column I with those in Column II.

Column I	*Column II*
(*a*) Oscillatory motion	moon around earth
(*b*) Periodic motion	pendulum
(*c*) Restoring force	2 s
(*d*) Second's pendulum	spring balance
(*e*) Principle of pendulum	Newton
	Galileo

56. Write scientific terms for each of the following statements :

(*a*) The distance between the mean position and one extreme position of the pendulum..... .....

(*b*) The time taken by the pendulum for one complete to and fro motion.....

(*c*) To and fro movement of a pendulum.....

(*d*) A motion which repeats itself at regular intervals of time.....

(*e*) The rest position of the pendulum.....

57. Choose the right answers in the following :

1. The period of the pendulum depends on its :

(*a*) Mass (*b*) Length (*c*) Amplitude (*d*) Energy

2. The period of a second's pendulum is :

(*a*) 1 s (*b*) 2 s (*c*) 3 s (*d*) 4 s

3. The motion of a swing is :

(*a*) Rotatory motion (*b*) Circular motion

(*c*) Oscillatory motion (*d*) Periodic motion

4. If a pendulum makes 20 oscillations in 3 m its time period is :

(*a*) 3 s (*b*) 6 s (*c*) 9 s (*d*) 12 s

5. To and fro movement of a pendulum is called :

(*a*) Oscillation (*b*) Amplitude (*c*) Period (*d*) None

6. The period of a pendulum whose length is 1 m is :

(*a*) 1 s (*b*) 2 s (*c*) 4·9 s (*d*) 9·8 s

7. If the length of the pendulum is doubled, the period of the pendulum is :

(*a*) halved (*b*) doubled (*c*) four times (*d*) one quarter

8. The force exerted by a stretched spring is an example of :

(*a*) Restoring force (*b*) Magnetic force (*c*) Electrical force (*d*) None

9. Forces are said to be balanced when the pendulum :

(*a*) Oscillates (*b*) Slows down (*c*) Stops (*d*) None

10. The value of pendulum constant is :

(*a*) 4·8 cm/s^2 (*b*) 12·4 cm/s^2 (*c*) 24·8 cm/s^2 (*d*) 48·8 cm/s^2

10

Waves

1. What is a wave ?

.....

.....

2. Is a wave disturbance or energy ?

.....

3. What travels in a wave—the disturbance or the particles of the medium ?

.....

4. How can you show that in a wave motion particles of the medium only oscillate to and fro about their mean position ?

.....

.....

.....

.....

5. What evidence can you think of to show that a wave transmits energy ?

.....

.....

.....

6. What is the common characteristic of all types of waves ?

.....

.....

7. State four examples of wave motion :

(*a*) ..... (*b*) .....

(*c*) ..... (*d*) .....

8. How is sound produced ?

.....

.....

9. What is a pulse ?

10. What is a periodic wave ? How is it produced ?

11. When a wave is generated in a pond, is it water or the wave or both which travel ?

12. State one difference between a pulse and a periodic wave.

Pulse	*Periodic Wave*

13. State two main characteristics of wave motion.

(*a*)

(*b*)

14. What is transferred by wave motion from one place to another—matter or energy ?

15. What are the two types of wave motions ?

(*a*) (*b*)

16. What is a transverse wave ?

17. Write two characteristics of transverse waves :

(*a*)

(*b*)

18. Give two examples of transverse waves :

(*a*)

(*b*)

19. What is a longitudinal wave ?

.....

.....

20. (*a*) State two characteristics of longitudinal waves :

(*i*) .....

(*ii*) .....

(*b*) Mention two examples of this type of wave :

(*i*) .....

(*ii*) .....

21. A stone is dropped on the surface of water in a pond. Name the type of wave produced. .....

22. Are the sound waves transverse or longitudinal ? .....

23. Distinguish between a transverse wave and a longitudinal wave :

	Transverse Wave	*Longitudinal Wave*
(*a*)	.....	.....
	.....	.....
(*b*)	.....	.....
	.....	.....

24. How does the motion of the particles of a medium differ from the motion of the wave ?

.....

.....

25. Explain the process by which the sound of your voice is transmitted through the air and is heard by another person.

.....

.....

.....

.....

.....

26. When a wire of sitar is plucked what type of waves are produced in :

(*a*) the wire : .....

(*b*) the air : .....

27. How do we say that sound travels in the form of longitudinal waves ?

.....

.....

.....

28. What is meant by the term 'the medium of propagation' as applicable to sound ?

.....

.....

.....

29. Can sound travel through vacuum ? .....

.....

30. In which of the three states of matter—solids, liquids and gases—is the speed of sound maximum ?

.....

31. Which travels faster—sound or light ? .....

.....

32. Does sound travel faster through water or through air ? .....

.....

33. What kind of a wave is light ? .....

.....

34. How do you know that sound travels slower than light ? Give an example to justify the statement.

.....

.....

.....

35. The steam of a railway engine is seen first and the whistle is heard a little later. Why ?

.....

.....

36. Define each of the following terms with reference to a wave motion :

(*a*) Vibration : .....

.....

(*b*) Time period : .....

.....

(c) Frequency : .....

.....

(d) Amplitude : .....

.....

(e) Wave-length : .....

.....

37. What is the relation between wave velocity, frequency and wave-length ?

.....

.....

38. What is the relation between frequency and time period ?

.....

39. Which waves do not require a medium for their propagation ?

.....

40. Why do we hear the sound of thunder after the flash of lightning is seen ?

.....

.....

41. Explain the terms 'compression' and 'rarefaction' as applicable to a wave motion :

(a) .....

.....

(b) .....

.....

42. Explain the terms 'crest' and 'trough' which are produced in wave motion :

(a) .....

.....

(b) .....

.....

43. What are the types of waves that can be produced in :

(a) Solid medium : .....

(b) Liquid medium : .....

(c) Gaseous medium : .....

44. What are electromagnetic waves ?

.....

.....

45. What are mechanical waves ?

.....

.....

46. State one difference between mechanical and electromagnetic waves.

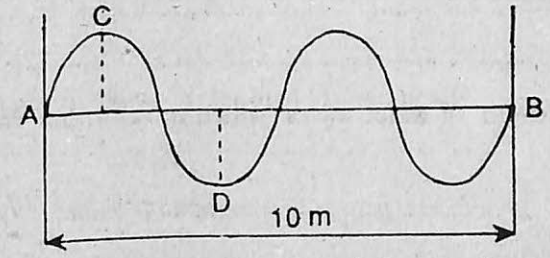
Mechanical Waves	*Electromagnetic Waves*
.....	.....
.....	.....

47. Name the type of waves produced when :

(*a*) A stone is dropped in a pond water .....

(*b*) A tuning fork is struck in air .....

48. The following diagram shows the side view of water-waves in a tank. On dipping a stone into the water, the disturbance moves from A to B in 3 s.



(*a*) Is there any flow of water in the direction of the wave ? .....

(*b*) How are the particles of water moving ? .....

(*c*) What type of wave motion is this ? .....

(*d*) Name the regions labelled as C and D. .....

49. Draw a diagram of a wave motion. Indicate crest, trough, amplitude, and wave-length in it.

50. Calculate the wave length produced if the velocity of sound in air is 330 m/s and the frequency is 825 Hz.

51. What do we measure with hertz (Hz) ?

52. A wave has a wave-length of 4 m and frequency of 200 Hz. Find its time period and velocity.

53. What is the speed of a periodic wave disturbance if the frequency is 2·5 Hz and wave length is 0·6 m ?

54. Calculate the wave-length of water waves which travel with a frequency of 0·50 Hz and speed of 4 m/s.

55. What is the wave-length of a periodic longitudinal wave in a coil spring of frequency 8 Hz and speed 20 m/s.

56. You see a fighter aeroplane before hearing its sound. Can you give any explanation for this phenomena ?

57. The frequency of a radio-wave is 600 KHz. Calculate the wave-length of the waves. (Velocity : 3×10^8 m/s).

58. If the velocity of sound in a medium is 1400 m/s and its wave-length is 1 Km, what will be its frequency ? Can you hear this sound ?

.....

.....

.....

59. What is the range of audible frequencies ? .....

.....

60. What is the frequency of a wave whose time period is 0·05 s. ?

.....

.....

61. Some water waves are found to have a wave-length of 2 cm and a frequency of 10 Hz. Find the speed of the waves.

.....

.....

.....

62. (*a*) How is wave-length of the wave denoted symbolically ? .....

.....

(*b*) What is this symbol called ? .....

.....

63. What is the value of the velocity of light ? .....

.....

64. What is the distance between two consecutive crests or troughs called ?

.....

65. What is the distance between two consecutive compressions or rarefactions called ?

OBJECTIVE TYPE QUESTIONS :

66. Fill in the blanks :

(*a*) The loudness of a sound is measured in.....

(*b*) Sound needs a.....to travel.

(*c*) The number of times a body vibrates every second is called its.....

(*d*) The greater the amplitude the greater the.....

(*e*) Sound travels in the form of.....

(*f*) Sound of frequencies above 20,000 Hz would be.....

(*g*) Waves of short durations are called.....

(*h*) The disturbance between two consecutive crests is equal to.....

(*i*) Wave-length of the wave is denoted by.....

(*j*) Light waves travel with a speed of.....m/s.

67. Indicate whether the following statements are true or false ?

(*a*) Sound travels in the form of transverse waves. ( )

(*b*) A stone thrown into water sets up longitudinal waves. ( )

(*c*) Sound travels through air better than through solids. ( )

(*d*) The range of audible frequencies is 20-20,000 vibrations. ( )

(*e*) Sound is produced by vibrating bodies. ( )

(*f*) Sound waves are transverse. ( )

(*g*) Waves are a carrier of energy. ( )

(*h*) The unit of frequency is Hertz. ( )

(*i*) Electromagnetic waves do not need any medium to travel. ( )

(*j*) Frequency of a wave is denoted by the Greek letter 'new'. ( )

68. Match the items in Column-I with those in Column-II.

Column-I	*Column-II*
(*a*) 20-20,000 Hz	Unit of sound
(*b*) Decibel	Audible frequencies
(*c*) 300 m/s	Speed of light
(*d*) 3×10^8 m/s	Speed of sound in air
(*e*) Hertz	Unit of velocity
	Unit of frequency

69. Provide scientific terms for each of the following statements :

(*a*) The points having maximum displacement from mean position in positive direction when transverse waves are propagated .....

(*b*) The distance between any two consecutive points that are in the same phase .....

(*c*) When sound waves are propagated in air the region where particles are most closely packed .....

(*d*) The distance travelled by the wave in a unit time in a particular direction .....

(*e*) Waves of short duration .....

70. Choose the right answer in the following :

1. Sound waves are :

(*a*) Longitudinal (*b*) Transverse (*c*) Electromagnetic (*d*) None

2. Waves transfer from one place to another :

(*a*) Mass (*b*) Energy (*c*) Velocity (*d*) Wavelength

3. The maximum displacement of the particles of a medium in which a wave is travelling is called :

(*a*) Amplitude (*b*) Frequency (*c*) Velocity (*d*) None

4. A wave in which the particles of the medium vibrate at right angle to the direction in which the energy travels is known as :

(*a*) Pulse (*b*) Transverse (*c*) Longitudinal (*d*) Compression

5. Hz is the unit of :

(*a*) Frequency (*b*) Wave-length (*c*) Time period (*d*) None

6. The relation between the wave length, the velocity and frequency of wave is given by :

(*a*) $V=f\lambda$ (*b*) $V=\lambda$ (*c*) $V=\frac{1}{T}$ (*d*) $Vf=\lambda$

7. If a sound wave travels with a speed of 340 m/s and has a frequency of 170 Hz, the wavelength is :

(*a*) 340 m (*b*) 170 m (*c*) 2 m (*d*) 0·5 m

8. The velocity of sound is maximum in :

(*a*) Solids (*b*) Liquids (*c*) Gases (*d*) Vacuum

9. The wave length of the wave is denoted by :

(*a*) lamda (*b*) new (*c*) V (*d*) L

10. Lamda is the unit of :

(*a*) Frequency (*b*) Wavelength (*c*) Amplitude (*d*) Time period

□□

11

Work and Energy

1. When does a force do work ?

.....

.....

.....

2. Define the term 'Energy'.

.....

.....

.....

3. What do we call to the physical quantity which has the capacity to do work ?

.....

.....

4. (*a*) What is the unit in which energy is measured ? .....

(*b*) Is energy a scalar quantity or a vector quantity ? .....

5. What do you understand by mechanical energy ?

.....

.....

.....

6. What are the two kinds of mechanical energy ?

(*a*) ..... (*b*) .....

7. What is kinetic energy ?

.....

.....

.....

8. Give three examples of bodies possessing kinetic energy :

(*a*) .....

(*b*) .....

(*c*) .....

9. What is potential energy ?

.....

.....

10. Give three examples of bodies possessing potential energy :

(*a*) .....

(*b*) .....

(*c*) .....

11. Indicate whether the following objects will exhibit kinetic or potential energy or a combination of the two :

(*a*) A raised hammer when struck on a stone : .....

(*b*) An expanded spring : .....

(*c*) A stone raised to a height : .....

(*d*) A rotating ceiling fan : .....

(*e*) Water in the reservoir of a dam : .....

12. Can an object have both potential and kinetic energy ?

.....

13. Give two examples of bodies possessing both the potential and kinetic energy :

(*a*) .....

(*b*) .....

14. What term is used to designate the sum of the potential energy and the kinetic energy of an object ? .....

15. Name two other forms of energy in which it manifests itself :

(*a*) ..... (*b*) .....

16. Name the form of energy which a wound-up watch spring possesses.

.....

17. Distinguish between kinetic energy and potential energy :

Kinetic energy	*Potential energy*
(*a*)	.....
(*b*)	.....

18. What kind of energy is stored in :

(*a*) A dam : .....

(*b*) An Atlas lying on a table : .....

(*c*) A moving scooter : .....

(*d*) A stretched bow : .....

(*e*) An aeroplane flying at height : .....

19. Does every change involve work ?

.....

.....

20. Define the term 'work' in scientific terms.

.....

.....

21. What are the conditions that hold good on a body when work is done :

(*a*) .....

(*b*) .....

22. Name and define the unit of work.

.....

.....

23. Is work a scalar or a vector quantity ? .....

24. What are the two quantities on which the amount of work done depends ?

(*a*) ..... (*b*) .....

25. If the force is measured in Newton and distance in metres, what will be the unit of work ? .....

26. State whether work is done in the following cases :

(*a*) A car moving at uniform speed : .....

(*b*) A labourer pushing a wall : .....

(*c*) A man standing on the bus stand : .....

27. What is the mathematical definition of work ?

.....

28. State the law of conservation of mechanical energy.

.....

.....

29. Name two factors on which the kinetic energy depends ?

(*a*) ..... (*b*) .....

30. Can a body possess energy even when it is not in motion ? Give one example.

.....

.....

31. What do you understand by transformation of energy ?

.....

.....

32. What is the importance of transformation of energy ?

.....

.....

33. Show that the total energy of a freely falling body remains constant at all points.

.....

.....

.....

.....

34. A body is thrown vertically upwards. Its velocity keeps on decreasing. What happens to its kinetic energy when its velocity becomes zero ?

.....

.....

.....

35. Name the transformation of energy which takes place in stopping a moving body after collision ?

.....

.....

36. Derive an expression for the kinetic energy of a body.

.....

.....

.....

37. How does the kinetic energy of a body depend upon its ;

(*a*) Mass : .....

(*b*) Velocity : .....

38. If the mass of an object is doubled keeping its velocity constant what will happen to its kinetic energy ?

.....

.....

39. How much work is done in lifting a stone of mass m from the ground to a height of h metre above the ground ?

.....

.....

40. A load of 100 Kg is pulled up by 5 m. Calculate the work done.

.....

.....

41. Derive an expression for the potential energy of a body.

.....

.....

.....

42. A boy weighing 60 N carries a trunk weighing 40 N up a staircase of height 3 m in 30 sec. Calculate the work done by the boy.

.....

.....

43. A shell of mass 2 kg is released from a gun with a speed of 15 m/s. Calculate its kinetic energy.

.....

.....

44. A car and a scooter are moving with the same speed. Which of the two has greater kinetic energy ? Give a reason in support of your answer.

.....

.....

45. If the velocity of an object is doubled keeping the mass constant, how will its kinetic energy change ?

.....

.....

46. What is the potential energy of a body due to ?

.....

47. Derive an expression for the gravitational potential energy of a body.

.....

.....

.....

48. On what factors does the magnitude of gravitational potential energy depend ?

(*a*) ..... (*b*) .....

49. Distinguish between work and energy :

Work	*Energy*
(*a*)	.....
.....	.....
(*b*)	.....
.....	.....

50. How much work is done by a force of 1 N in moving an object through a distance of 1 m in the direction of the force ?

.....

.....

51. A crane lifts a load of 100 kg through a height of 10 m. Calculate the work done by the crane.

.....

.....

52. What is the kinetic energy of a body of mass 1 kg which moves with a uniform velocity of 10 m/s ?

.....

.....

53. Calculate the gravitational potential energy of a bucket of water of mass 20 kg which is carried up by one floor at a height of 5 m.

.....

.....

54. Write an expression for the potential energy of an object which it gains as a result of being lifted.

.....

.....

55. What becomes of the original kinetic energy when :

(*a*) A bullet embeds itself in a bag of sand : .....

(*b*) A boy claps his hands together : .....

56. The height of Qutab Minar is 72 m. What is the work done by a man of 50 kg weight when he climbs up the top ?

.....

.....

57. A body of mass 5 kg is placed on a table which is 5 m high. Calculate the potential energy of the body.

.....

.....

58. Calculate the work done by a man in carrying a load of 20 kg on his head when he covers a distance of 20 m in the horizontal direction.

.....

.....

59. A falling body weighing m kg has a velocity v m/s when it is h m above the ground. Write down expressions for its :

(*a*) Kinetic energy : .....

(*b*) Potential energy : .....

60. A body of mass 2 kg falls from a roof. What will be its kinetic energy during the fall at the end of 2 s ? Assume g—10 m/s^2.

.....

.....

61. What is the kinetic energy of a body of weight 1 kg moving with a velocity of 2 m/s ?

.....

.....

62. (*a*) Define a Joule.

.....

.....

(*b*) How is it related to the kg wt/m ?

.....

63. Rosy finds a heavy stone on her way to school. She pushes it hard. After sometimes she feels tired How much work has she done ? Why ?

.....

.....

.....

64. When a brick lying at the top of a house falls towards the ground, what happens to its initial potential energy ?

.....

.....

65. Can energy be created or destroyed ? What happens during transformation of energy ?

.....

.....

66. What is meant by the term 'escape velocity' ?

.....

.....

67. What should be the energy of the projectile so that it can overcome earth's gravity and escape into space ?

.....

68. On what factors does escape velocity depend ?

(*a*) ..... (*b*) .....

69. Which would have a greater effect on the kinetic energy of an object—doubling the mass or doubling the velocity ? .....

70. A man of mass 50 kg jumps a height of 1·2 m. What is his potential energy at the highest point ?

.....

.....

71. How fast should a man of mass 50 kg run so that his kinetic energy is 625 J ?

.....

.....

72. Calculate the work done in taking a packet of mass 10 kg to the top of a house of height 14 m.

.....

.....

73. Deduce the equation $V_2^2 - V_1^2 = 2gd$ by applying the principle of conservation of energy in the case of a freely falling object.

.....

.....

.....

.....

74. What is the value of work done if under the influence of force F a body covers a distance *s* in a direction making an angle θ from the direction of force ?

.....

.....

OBJECTIVE TYPE QUESTIONS :

75. Fill in the blanks :

(*a*) Energy can neither be.....nor.....

(*b*) If the speed of a car is increased its kinetic energy will.....

(*c*) Objects in motion have.....

(*d*) Energy is often converted from.....form into.....

(*e*) Energy of a body is its..... .....for doing work.

(*f*) A boy does.....work if he keeps standing on a bench.

(*g*) The energy possessed by objects due to their position is called.....

(*h*) The sum of the P.E. and the K.E of an object is called its.....

(*i*) The object that does work loses.....

(*j*) Work done=.....×.....

76. Indicate whether the following statements are true or false :

(*a*) A moving car possesses potential energy. ( )

(*b*) Newton is the unit of work. ( )

(*c*) Energy of an object is its capacity to do work. ( )

(*d*) A flowing river has potential energy. ( )

(*e*) A stationary train has neither potential nor kinetic energy. ( )

(*f*) The parachutist has more potential energy when he is in the air. ( )

(*g*) The objects on which work is done gain energy. ( )

(*h*) Energy and work done are measured in the same units. ( )

(*i*) Kinetic energy of an object is equal to mgh. ( )

(*j*) Escape velocity depends on the mass and radius of the earth. ( )

77. Choose the right answer from the following :

1. When velocity of an object is doubled its kinetic energy becomes :

(*a*) Double (*b*) Four times (*c*) Half (*d*) One-fourth

2. The basic unit of work is :

(*a*) Newton (*b*) Metre (*c*) N/m (*d*) N/s

3. The basic unit of energy is :

(*a*) Newton (*b*) N/s (*c*) Joule (*d*) None

4. Kinetic energy of a body is directly proportional to its :

(*a*) Speed (*b*) Square of its speed (*c*) Square of the mass (*d*) None

5. When the clock is wound the energy is stored in the form of :

(*a*) Potential energy (*b*) Kinetic energy (*c*) Heat energy (*d*) None

6. When a stone is released from a height its potential energy is transformed into :

(*a*) Kinetic energy (*b*) Heat energy (*c*) Electrical energy (*d*) None

7. A body which weighs 10 N is dragged across a level floor by a horizontal force of 3N for a distance of 5 m. The work done in Joules is :

(*a*) 15 (*b*) 30 (*c*) 50 (*d*) 500

8. A 5 kg mass is raised 8 m above the ground. Its change in potential energy with respect to the ground in Joules is :

(*a*) 40 (*b*) 80 (*c*) 200 (*d*) 390

9. The formula to calculate kinetic energy of an object is :

(*a*) mgh (*b*) $1/2\ mv^2$ (*c*) mg (*d*) mv^2

10. A 1 kg mass has a kinetic energy of 1 J when its speed is :

(*a*) 0·45 m/s (*b*) 1 m/s (*c*) 1·4 m/s (*d*) 4·4 m/s

□□

12

Heat

1. What is heat ?

.....

.....

2. What happens to the kinetlc energy of the molecules when a gas is cooled below its condensation point ?

.....

3. What happens to the kinetic energy of the molecules when we cool a liquid below its freezing point ?

.....

4. (*a*) Who proposed the kinetic molecular theory of heat ? .....

(*b*) Name three scientists who refined his theory : .....

.....

(*c*) Explain the kinetic molecular theory of heat : .....

.....

.....

.....

5. Define temperature.

.....

6. How will you show that the degree or hotness and coolness of a body is relative ?

.....

.....

.....

.....

7. How will you show that the sensation of hotness depends upon the nature of the body we touch ?

.....

.....

.....

8. Name the device that is used to measure the degree of hotness of a body.

.....

9. (*a*) What is a thermometer ?

.....

(*b*) Who invented it for the first time ?

.....

10. (*a*) Which device was invented by Galileo to measure temperature ?

.....

(*b*) Which property of a substance does a thermometer make use of ?

.....

11. What is the principle underlying thermometry ?

.....

.....

12. Why are the temperatures of pure melting ice and of pure boiling water at normal pressure taken as fixed points on the thermometer ?

.....

.....

.....

13. Name the two types of thermometric scales.

(*a*) ..... (*b*) .....

14. What are the fixed points of a thermometer on the Celsius scale :

(*a*) Lower fixed point : ..... (*b*) Upper fixed point : .....

15. What are the upper and lower fixed points in a Fahrenheit scale ?

(*a*) Upper fixed point : ..... (*b*) Lower fixed point : .....

16. How does 0° C compare to the temperature on the Fahrenheit scale ?

.....

17. What is the relation between Celsius and Fahrenheit scale ?

.....

18. With the help of a neat labelled diagram describe a clinical thermometer and explain how it is used to measure the temperature of the body.

.....

.....

.....

.....

19. In how many parts is the fundamental interval divided in a :

(*a*) Celsius thermometer : ..... (*b*) Fahrenheit thermometer : .....

20. Why is Celsius thermometer more convenient to use in preference to Fahrenheit thermometer ?

.....

.....

21. (*a*) Which thermometer is used to measure the temperature of human beings ?

.....

(*b*) What is the temperature of a healthy human body ?

.....

(c) What will be its value in Celsius scale ?

.....

22. At what temperature would Celsius and Fahrenheit thermometers give the same reading ?

.....

23. A thermometer reads 37°C as the temperature of a person who has fever. What will be the corresponding reading on the Fahrenheit scale ?

.....

24. If the temperature of boiling water falls by 20°C when cooled, how much will the fall be when read on Fahrenheit scale ?

.....

25. Convert the following Celsius temperatures into Fahrenheit scale :

(*a*) 37° C .....

(*b*) 40·5° C .....

(*c*) 114·8° C .....

(*d*) 107·6° C .....

(*e*) 100°C .....

26. Convert the following Fahrenheit temperatures into Celsius scale :

(*a*) 98·6° F .....

(*b*) 105° F .....

(*c*) 46° F .....

(*d*) 42° F .....

(*e*) 32° F .....

27. Give two points of differences between heat and temperature :

	Heat	*Temperature*
(*a*)	.....	.....
(*b*)	.....	.....

28. What is meant by the state of thermal equilibrium ?

.....

.....

29. What is the state of the system when no exchange of heat takes place between two bodies in contact ?

.....

30. How do you explain that heat is produced on rubbing our hands together ?

.....

.....

31. Kinetic energy of a body due to friction appears in the form of heat or thermal energy. Explain.

.....

.....

32. Why does a meteorite entering the earth's surface get heated due to friction with air and completely vaporise before reaching the surface of the earth ?

.....

.....

33. Why are sparks produced when two stones are struck against each other ?

.....

34. (*a*) What is meant by 'specific heat' of a substance ?

.....

.....

(*b*) What are the units of heat ?

(*i*) ..... (*ii*) ..... (*iii*) .....

35. (*a*) Define the term Kilo-Calorie.

.....

.....

(*b*) What is the relation between Joule and Calorie ?

.....

(*c*) What is the relation between Kilo-Calorie and Calorie ?

.....

36. Give an expression to calculate the specific heat of a substance.

.....

37. Indicate the values of specific heats of the following substances :

(*a*) Water : ..... (*b*) Marble : .....

(*c*) Glass : ..... (*d*) Iron : .....

(*e*) Copper : ..... (*f*) Mercury : .....

38. (*a*) Which liquid has maximum value of specific heat ?.....

(*b*) Which liquid has the minimum value of specific heat ?.....

39. Which property of water makes it useful as a cooling agent in the radiators of automobiles ?.....

40. Which property of mercury makes it useful for filling in the thermometer ?

.....

41. (*a*) Define the term thermal capacity or heat content of a substance.

.....

.....

(*b*) What is the unit of thermal capacity ?

.....

(*c*) Write the formula to calculate thermal capacity of a substance.

.....

42. Why does one fill a hot water bottle with hot water rather than with any other liquid ?

.....

.....

43. The specific heat of water is relatively high. Give two examples where this property of water is useful to us :

(*a*) .....

(*b*) .....

44. Write an expression for heat Q required to raise the temperature of m kg of a substance of specific heat C through T° C.

.....

45. Why do substances expand on heating ?

.....

.....

46. Define Linear expansion of a substance.

.....

.....

47. Explain the meaning of the term 'Cubical expansion of a liquid'.

.....

.....

48. (*a*) Define the coefficient of linear expansion.

.....

.....

(*b*) Write its mathematical notation : .....

(*c*) What is its unit ?.....

49. (*a*) Define the coefficient of cubical expansion.

.....

.....

(*b*) What is its symbol ? .....

(*c*) What is its unit ? .....

50. What formula is used to calculate the :

(*a*) Coefficient of linear expansion.....

(*b*) Coefficient of cubical expansion.....

51. Name three practical applications where expansion of solids is important :

(*a*) .....

(*b*) .....

(*c*) .....

52. Why is a small gap left between two railway lines ?

.....

.....

53. Why is the unit of alpha independent of the unit of length ?

.....

.....

54. What is the relation between alpha and gamma co-efficients ?

.....

55. Why are telephones wires kept sagging ?

.....

.....

56. A hot milk is added to two identical cups one made of glass and other copper. Which cup can break and why ?

.....

.....

57. Why do ordinary glass vessels break while pyrex and corning glasswares do not ?

.....

.....

58. Why do loops are left in the metallic pipes which are used to carry liquids over long distances ?

.....

.....

59. State two factors on which the change in length of a metal rod depends on heating :

(*a*) ..... (*b*) .....

60. How does the change in length (12—11) of a metal rod depend upon the change in temperature (T_2—T_1) provided it is not too large ?

.....

61. Write an expression for the change in length of a metallic rod on heating.

.....

62. State two factors on which change in volume of the liquids depends :

(*a*) ..... (*b*) .....

63. How does the change in volume (V_2—V_1) of a liquid depend upon the change in temperature (T_2—T_1) ?

.....

64. Give the values of co-efficients of linear expansion of the followings :

(*a*) Pyrex glass : ..... (*b*) Soft glass : .....

(*c*) Steel : ..... (*d*) Iron : .....

(*e*) Copper : ..... (*f*) Gold : .....

65. What are the values of coefficients of cubical expansion of the following substances ?

(*a*) Mercury : ..... (*b*) Water : .....

(*c*) Benzene : ..... (*d*) Alcohol : .....

66. Explain why when heat is supplied to a mixture of ice and water, the temperature does not rise until all the ice has melted.

.....

.....

.....

67. (*a*) Define latent heat of melting.

.....

.....

(*b*) What is its unit ? .....

68. (*a*) What is fusion ?

.....

(*b*) What is the temperature at which the process takes place ? .....

.....

69. Define latent heat of fusion.

.....

.....

70. What is the value of latent heat of fusion of ice ? .....

71. (*a*) Define latent heat of vaporization.

.....

.....

(*b*) What is its value for water ? .....

72. What do you understand by the term 'evaporation'.

.....

.....

73. State two factors on which the rate of evaporation depends.

(*a*) ..... (*b*) .....

74. Why do trees acquire more leaves during summer ?

.....

.....

75. How does perspiration help in cooling down our body ?

.....

.....

76. Why does one feel cold when wearing wet clothes ?

.....

.....

77. How do earthen pitchers keep the water cool in summer ?

.....

.....

78. What do you understand by the term humidity ?

.....

.....

79. How is evaporation used to measure humidity ?

.....

.....

80. When do you feel sultry and why ?

.....

.....

81. Define relative humidity.

.....

.....

82. What do low and high values of relative humidity indicate ?

.....

83. Why do droplets appear on the outside of a glass tumbler containing iced water ?

.....

.....

84. What percent of relative humidity is comfortable for human beings ?

.....

85. Why do people during summer sprinkle water on the roof or on open ground near their house ?

.....

.....

86. How will you show the presence of water vapours in the atmospheric air ?

.....

.....

.....

87. What are the sources of water vapours in the air ?

(*a*) ..... (*b*) ..... (*c*) .....

88. How much heat must be added to raise the temperature of 100 g of water from 5°C to 95°C ?

.....

.....

89. How much heat is required to raise the temperature of copper vessel of mass 0·10 kg through 40°C. (*Given* : Specific heat of copper $0{\cdot}39 \times 10^3$ J/kg/°C).

.....

.....

90. Calculate the amount of heat required to heat 2 kg of water from 25° to 100°C. Given that specific heat of water is $4{\cdot}18 \times 10^3$ J/kg /°C

.....

.....

91. 500 g of water is to be heated from 20°C to 100°C to make a cup of coffee. How much heat is required ?

.....

.....

92. The coefficient of linear expansion of copper is 17×10^{-6}/°C. What will be its coefficient of cubical expansion ?

.....

93. What is the amount of heat energy required to boil off 1 kg of ice which is at 0°C ? Latent heat of ice is 80 K Cal/kg. and latent heat of steam is 540 KCal/kg.

.....

.....

94. 5 kg of water at 70°C is mixed with 10 kg of water at 10°C taken in a bucket. What is the resultant temperature of the mixed water ?

.....

95. How many Joules of heat is given out when a piece of iron of mass 0·1 kg. and specific heat capacity is $0{\cdot}48 \times 10^3$ J/kg °C cools from 80°C to 20°C ?

.....

.....

96. How large should a gap be left between rails that are 40 m long when laid at 20°C if they are to just barely touch at 45°C ? The coefficient of linear expansion of iron is 12×10^{-6}/°C.

.....

.....

97. The length of an iron rod is 50 m at 0°C. If the coefficient of linear expansion of iron is 12×10^{-6}/°C, what will be its length at 10°C ?

.....

.....

98. How much will be the change in length of a 2 m brass rod when heated through a temperature of 70°C ? The coefficient of linear expansion of brass is $1{\cdot}8 \times 10^{-6}$/°C.

.....

.....

99. How much heat is needed to melt 15 kg of ice at 10°C ? Latent heat of melting of ice is 325 J.

.....

.....

100. A metal bar 5 m long expands 0·5 cm when heated from 25°C to 125°C. What is the coefficient of linear expansion of the bar ?

.....

.....

101. How much will be the change in volume of 2 litres of water when heated from 25°C to 75°C ? The coefficient of cubical expansion of water is 21×10^{-5}/°C.

.....

.....

102. A scale made of steel is exactly 100 cm long at 30°C. What would be its length at 0°C ? Coefficient of linear expansion of steel is $1{\cdot}2 \times 10^{-5}$/°C.

.....

.....

103. 2 litres of water expands to 0·021 litres on heating from 25°C to 125°C. What is its coefficient of cubical expansion ?

.....

.....

OBJECTIVE TYPE QUESTIONS

104. Fill in the blanks :

(*a*) The unit of coefficient of linear expansion is .....

(*b*) Q= ..... m × .....

(*c*) The specific heat of water is $4{\cdot}18 \times 10^3$ .....

(*d*) ..... Increase in length/ ..... × .....

(*e*) If Relative humidity is ..... clothes do not dry .....

(*f*) Calorie, KCal and Joule are the units of .....

(*g*) Heat always flows from a ..... body to a ..... one.

(*h*) The amount of water vapour in air is termed as .....

(*i*) The relative humidity of about 50% is .....

(*j*) Fahrenheit scale=1·8 (C) .....

105. Are the following statements true or false ?

(*a*) The normal temperature of the human body is 37°C. ( )

(*b*) A substance expands on heating and contracts on cooling. ( )

(*c*) During change of state there is no rise in temperature. ( )

(*d*) The unit of specific heat is J/kg/°C. ( )

(*e*) Mercury has the highest specific heat and water the lowest. ( )

(*f*) Heating a substance increases the energy of its molecules. ( )

(*g*) The coefficient of therm l expansion is symbolised as. ( )

(*h*) The value of coefficient of linear expansion of copper is ..... ( )

(*i*) The value of y in benzene is six times higher than that of ..... ( )

(*j*) The process of transpiration keeps our body cool ..... ( )

106. Choose the right answers in the following :

1. When an object is heated the atoms that make up the object :

   (*a*) Begin to move faster (*b*) Lose energy (*c*) Become lighter (*d*) Become heavier.

2. When a vapour condenses into a liquid it :

   (*a*) Absorbs heat (*b*) Evolves heat (*c*) Temperature rises (*d*) Temperature falls.

3. The specific heat of water is 4180 J/kg^1/°C. The amount of heat required to raise the temperature of 0·15 kg of water from 15°C to 25°C is :

   (*a*) 62·7 J (*b*) 627 J (*c*) 6270 J (*d*) 62700 J

4. The first thermometer was developed by :

   (*a*) Galileo (*b*) Celsius (*c*) Fahrenheit (*d*) None

5. The freezing and boiling point of water on Fahrenheit scale is :

   (*a*) 0 and 100F (*b*) 0 and 80F (*c*) 32 and 212F (*d*) None

6. To produce 1 Calorie of heat work done must be :

   (*a*) 0·42 J (*b*) 4·2 J (*c*) 42 J (*d*) 420 J

7. Which of the following liquid has the highest specific heat ?

   (*a*) Mercury (*b*) Water (*c*) Kerosene oil (*d*) Coconut oil

8. The energy required to heat 1 kg of water from 25°C to 75°C is :

   (*a*) $2{\cdot}09 \times 10^5$ J (*b*) $20{\cdot}9 \times 10^5$ J (*c*) 209×10^5 J (*d*) None

9. When a liquid changes into a solid the process is called :

   (*a*) Freezing (*b*) Melting (*c*) Vaporization (*d*) Condensation

10. Which of the following has the highest coefficient of linear expansion ?

    (*a*) Gold (*b*) Copper (*c*) Iron (*d*) Steel

13
Light

1. What is light ?

.....

.....

2. Name any three sources of light :

(*a*) ..... (*b*) ..... (*c*) .....

3. Write the name of two optical instruments :

(*a*) ..... (*b*) .....

4. What is meant by reflection ?

.....

.....

5. With the help of a suitable diagram, define the following terms :

(*a*) Incident ray :

.....

(*b*) Normal :

.....

(*c*) Angle of incident :

.....

(*d*) Reflected ray :

.....

(*e*) Angle of reflection :

.....

6. State two Laws of reflection :

(*a*) .....

.....

(*b*) .....

.....

7. (*a*) What is meant by spherical mirrors ?

.....

.....

(*b*) Name two types of spherical mirrors you are familiar with :

(*i*) ..... (*ii*) .....

8. Distinguish between a concave and a convex mirrors :

	Concave mirror	*Convex mirror*
(*a*)	.....	.....
(*b*)	.....	.....

9. (*a*) Define image.

.....

.....

(*b*) What is a real image ? Give an example.

.....

.....

(*c*) What is a virtual image ? Give an example.

.....

.....

10. Distinguish between a real and a virtual image :

	Real image	*Virtual image*
(*a*)	.....	.....
(*b*)	.....	.....

11. Which type of image is always erect with respect to the object ? .....

.....

12. Define the following terms with regard to the spherical mirrors with the help of a neat diagram :

(*a*) Centre of curvature :

.....

(*b*) Pole of the mirror :

.....

(*c*) Radius of curvature :

.....

(*d*) Aperture :

.....

(*e*) Focal length :

.....

(*f*) Focal plane :

.....

13. Name the kind of mirror used to obtain :

(*a*) A real image : .....

(*b*) A virtual image smaller than the object : .....

.....

(*c*) A virtual image having the same size as that of the object .....

.....

14. Indicate the position, size and the nature of the image formed by a concave mirror for the following positions of objects :

Position of the object	*Position of the image*	*Nature and size of the image*
(*a*) At infinity	.....	.....
(*b*) At C	.....	.....
(*c*) Between F and C	.....	.....
(*d*) At F	.....	.....
(*e*) Between P and F	.....	.....

15. Indicate the position, size and the nature of the image formed by a spherical lens for the following positions of the objects :

Position of the object	*Position of the image*	*Nature and size of the Image*
(*a*) At infinity	.....	.....
(*b*) At 2 F_1	.....	.....
(*c*) Beyond 2 F_1	.....	.....
(*d*) Between F_1 and 2 F_1	.....	.....
(*e*) At focus F_1	.....	.....

16. Write the mirror formula.

.....

17. Draw ray diagrams to show the nature, size and position of the image formed when the object is placed :

(*a*) At infinity from a concave mirror :

(*b*) At the centre of curvature of a concave mirror :

(*c*) At infinity from a convex mirror :

(*d*) At the principal focus of a concave mirror :

(*e*) Between the pole and the principal focus of a concave mirror :

18. What is the relation between the focal length f, the distance of an object from the mirror u, the distance of the image from the mirror v ?

.....

19. Is mirror formula applicable to all concave and convex mirrors for all distances of objects and images ?

.....

.....

20. What formula would you use to calculate the size of an image as compared to that of an object ?

.....

.....

.....

21. $M = \frac{\text{.....}}{\text{.....}}$

22. Which type of mirror is to be used to obtain an enlarged image of an object ?.....

.....

23. Which mirror always produces a diminished, erect and virtual image of an object ? .....

24. State the sign convention adopted to measure distances involving spherical mirrors :

(*a*) .....

(*b*) .....

.....

(*c*) .....

25. Does the reflection of light at the spherical mirror follow the Laws of Reflection ?

.....

26. (*a*) What is meant by power of a lens ?

.....

.....

(*b*) In which unit is it measured ? .....

27. What is the relationship between power of a lens D, and the focal length f (in cm) ?

.....

28. If the power of a lens is $+0{\cdot}5$ D, calculate its focal length.

.....

.....

29. If the focal length of a lens is 20 cm, what would be its power ?

.....

30. The focal length of a lens is negative. What type of mirror is this ? .....

.....

31. If the focal length of a lens is positive, identify the type of lens.

.....

32. If the focal length of a converging lens is 30 cm, calculate its power.

.....

33. If the focal length of a diverging lens is 10 cm, calculate its power.

.....

34. Calculate the magnifying power of a convex lens of focal length 5 cm.

.....

35. If the magnification of a body of size 2 m is 4, what is the size of the image ?

.....

.....

36. An object is placed 10 cm from a convex mirror of focal length 20 cm. Find the position of the image.

.....

.....

37. An object is placed at a distance of 24 cm from the vertex of a concave mirror. Its image is observed at 12 cm from the vertex. What is the focal length of the mirror ?

.....

.....

38. An object is placed 5 cm from the vertex of a convex mirror of focal length 20 cm. Find the position of the image.

.....

.....

39. An object is 10 cm from a convex mirror of focal length 20 cm. Find the position of the image.

.....

.....

40. A small object is placed 6 cm away from a converging lens of focal length 10 cm. Find the position and magnification of the image.

.....

.....

41. An object 5 cm tall is placed 30 cm from a convex lens of focal length 10 cm. Find the position and size of the image.

.....

.....

42. The power of a lens is +2·5 D. What kind of lens is it and what is its focal length ?

.....

.....

43. (*a*) What type of lenses are used in a camera ? .....

.....

(*b*) How does the sharpness of the image depends on the size of the aperture in a lens camera ?

.....

.....

44. (*a*) What is meant by spherical aberration ?

.....

.....

(*b*) How can this defect be removed ?

.....

.....

45. (*a*) What are anastigmat lenses ?

.....

.....

(*b*) Where are they used ?

.....

46. Draw a diagram of the human eye and label the following parts :

ciliary muscles, retina, cornea, iris, pupil, optic nerves, suspensory ligament.

47. State one function of each of the following :

(*a*) Retina

.....

(*b*) Cornea

.....

(*c*) Iris

.....

(*d*) Pupil

.....

(*e*) Ciliary muscles

.....

48. State two similarities between the camera and the human eye :

	Camera	*Human eye*
(*a*)	.....	.....
(*b*)	.....	.....

49. Write two differences between the camera and the human eye :

	Camera	*Human eye*
(*a*)	.....	.....
(*b*)	.....	.....

50. How will you explain the term 'power of accommodation' as applicable to human eye ?

.....

.....

51. Name two common optical defects of human eyes :

(*a*) ..... (*b*) .....

52. (*a*) What is short-sightedness or myopia ?

.....

.....

(*b*) Give reasons for this defect in a person.

.....

(*c*) How can this defect be corrected ?

.....

(*d*) Illustrate your answer with ray diagram.

53. (*a*) What is long-sightedness or hypermetropia ?

.....

.....

(*b*) How can this defect be corrected ?

.....

54. (*a*) What is astigmatism ?

.....

.....

(*b*) What type of lenses do you suggest for a person suffering from the above defect ?

.....

55. Why do most people eventually wear glasses as they grow old ?

.....

.....

56. A man can see distant objects clearly but feels difficulty in reading a book. What type of defect of vision does he have ?

.....

57. Which type of eye defect can be rectified by using :

(*a*) Convex lens : .....

(*b*) Concave lens : .....

(*c*) Bifocal lenses : .....

58. Why do some people hold a book very close to their eyes while reading ?

.....

.....

59. (*a*) Define the term 'the distance of distinct vision' ?

.....

.....

(*b*) What is the location of near point and far point of a normal human eye ?

.....

60. Name two devices by which the range of normal eye can be extended :

(*a*) ..... (*b*) .....

61. Name two magnification devices commonly used by us :

(*a*) ..... (*b*) .....

62. Mention one use of each of the following :

(*a*) Microscope :

.....

(*b*) Telescope :

.....

63. Microscope and telescope make use of two lens system. Name them :

(*a*) ..... (*b*) .....

64. What do you understand by the magnifying power of a simple microscope ?

.....

.....

65 Derive an expression for the magnifying power of a simple microscope in terms of its focal length and the distance of distinct vision.

.....

66. What is the magnification of the following :

(*a*) Simple microscope : .....

(*b*) Compound microscope : .....

(*c*) Electron microscope : .....

67. Who invented telescope ?

.....

68. Explain with the help of a ray diagram the working of a Galilean telescope.

.....

.....

.....

.....

69. In a telescope, which one has a shorter focal length—the objective or the eye-piece ?

.....

70. State one use of the :

(*a*) Terrestrial telescope : .....

(*b*) Astronomical telescope : .....

71. State the characteristics of the final image formed by a :

(*a*) Camera : .....

(*b*) Terrestrial telescope : .....

(*c*) Astronomical telescope : .....

72. Describe the working of an astronomical telescope.

.....

.....

.....

.....

73. Which are the three primary or basic colours ?

(*a*) ..... (*b*) ..... (*c*) .....

74. Which colour can be formed by mixing :

(*a*) Red and blue : .....

(*b*) Red and green : .....

(*c*) Blue and green : .....

75. What happens when the sunlight passes through a prism ?

.....

.....

76. What do you understand by :

(*a*) Dispersion :

.....

.....

(*b*) Spectrum :

.....

.....

77. (*a*) When do you see a rainbow ?

.....

(*b*) What colours has a rainbow ?

.....

78. Why does the grass look green and the rose red ?

.....

.....

79. On what factor does the colour of a body depend ?

.....

80. (*a*) Which part of the human eye contains light sensitive cells ?

.....

(*b*) What are these cells called ?

.....

81. State one function of each of the following :

(*a*) Rods : .....

(*b*) Cones : .....

82. (*a*) Who are called colour blind ? .....

(*b*) Is it a inheritable disease ? .....

(*c*) What is it due to ? .....

83. Why do chickens become active with the sun and roosts by sundown ?

.....

.....

.....

84. Explain why a book appear red when seen through a red transparent piece of glass but black when seen through a green one ?

.....

.....

.....

OBJECTIVE TYPE QUESTIONS

85. Fill in the blanks :

(*a*) The mid point of a mirror is known as its .....

(*b*) A ..... lens always produces a virtual, erect and diminished image.

(*c*) In a camera ..... lenses are used.

(*d*) The iris controls the size of the ..... in human eye.

(*e*) Light sensitive cells of human eye are ..... and .....

(*f*) The distance of distinct vision is ..... cm.

(*g*) Bifocal lenses are used to rectify ..... defect of the eyes.

(*h*) Telescope and microscope are ..... devices.

(*i*) Red, blue and green are the three ..... colours.

(*j*) Splitting of light into its constituent colours is called.....

86. Write true or false against each of the following statements :

(*a*) Human beings are ultraviolet blind. ( )

(*b*) John Dalton was known to be colour blind. ( )

(*c*) Cones of human retina responds to colours. ( )

(*d*) The Starry Messenger book was written by Newton. ( )

(*e*) A telescope brings distant objects closer to the eye. ( )

(*f*) A concave lens is not a diverging lens. ( )

(*g*) Power of lens has no units. ( )

(*h*) The amount of light entering human eye is controlled by pupil. ( )

(*i*) The final image is erect in astronomical telescope. ( )

(*j*) The colour of an object depends upon the wave-length of the light. ( )

87. Write scientific terms for the following :

(*a*) Light sensitive cells of the human eye : .....

(*b*) A person who fails to identify colours : .....

(*c*) A lens having a negative focal length : .....

(*d*) Splitting of light into its components : .....

(*e*) The spread out patch of light on the screen : .....

88. For a concave mirror match the items in Column I with those in Column II

Column I	*Column II*
Position of the object	*Position of the image*
(*a*) At focus	At centre of curvature
(*b*) At infinity	Beyond centre of curvature
(*c*) At centre of curvature	At focus
(*d*) Between focus and Pole	Behind the mirror
(*e*) Between focus and centre of curvature	At infinity

89. Choose the right answer from the following :

1. The image of an object formed by the human eye lens at retina is :

(*a*) Erect (*b*) Inverted (*c*) Virtual (*d*) None

2. The Physicist who discovered the phenomenon of dispersion is :

(*a*) Newton (*b*) Galileo (*c*) Einstein (*d*) Raman

3. The distance of distinct vision for a normal eye is :

(*a*) 0·25 cm (*b*) 2·5 cm (*c*) 25 cm (*d*) 25 m

4. A convex lens has a focal length of 20 cm. Its power in Dioptres is

(*a*) 0·2 (*b*) 0·5 (*c*) 2 (*d*) 5

5. Myopia is corrected by using a :

(*a*) Convex lens (*b*) Concave lens (*c*) Convex mirror (*d*) None

6. The power of a lens is —5 D, its focal length is :

(*a*) 0·2 m (*b*) 2 m (*c*) 5 m (*d*) 20 m

7. The human eye forms the image of an object at its :

(*a*) Cornea (*b*) Iris (*c*) Pupil (*d*) Retina

8. When red and green colour light falls on the same spot on a white screen, the colour on the screen will appear to be :

(*a*) Magenta (*b*) Blue (*c*) Cyan (*d*) Yellow

9. The change in focal length of eye lens to focus image of object at varying distances is done by the action of :

(*a*) Pupil (*b*) Ciliary muscles (*c*) Retina (*d*) Blind spot

10. Which of the following is a genetic disorder ?

(*a*) Myopia (*b*) Hypermetropia (*c*) Astigmatism (*d*) Colour blind

□□

14

Electricity and its Effects

1. What is meant by 'electrostatic potential' ?

.....

.....

2. What is the unit of potential ?

.....

3. Define Volt.

.....

.....

4. Is electric potential a scalar or a vector quantity ?

.....

5. What do you mean by electrical potential ?

.....

.....

6. In what direction does the electric current flow ?

.....

7. Distinguish between electric potential and the electric potential difference :

Electric potential	*Electric potential difference*
.....	.....
.....	.....

8. Explain the meaning of the statement 'the potential difference between two points is 1 V'.

.....

.....

9. How much work is done when one Coulomb of charge moves against a potential difference of 1 Volt ?

10 A body is given Q Coulomb of charge to raise its potential by V Volts. Find out the amount of work done.

11. How much work is done in moving a charge of 2 Coulombs from a point at 90 V to another point at 120 V ?

12 20 J of work is done in bringing a body carrying two units of positive charge from point A to point B. What is the potential difference between A and B ?

13. What constitute an electric current ?

14. What is an electric current due to ?

15. Which particles constitute an electric current in a metallic conductor ?

16. (*a*) How can the current flow be maintained ?

(*b*) Name any simple device which can be used to achieve this :

17. What is the unit of electric current ?

18. Define the unit ampere.

9. How will you calculate the strength of current ?

.....

20. One coulomb of charge flows through any cross-section of a conductor in 1 s. What is the current flowing through the conductor ?

.....

21. Write down the formula which establishes relation between electric charge, time and electric current.

.....

22. (*a*) What is the use of an ammeter ?

.....

(*b*) How will you connect an ammeter in an electric circuit ?

.....

.....

3. (*a*) What is the use of voltameter ?

.....

(*b*) Which of the two has high resistance : a voltameter or an ammeter ?

.....

(*c*) How is Voltameter connected in the circuit ?

.....

4. Distinguish between a voltameter and an ammeter.

	Voltameter	*Ammeter*
(*a*)	.....	.....
(*b*)	.....	.....

. How will you determine the potential difference between the terminals of a cell using a voltameter ?

.....

.....

.....

.....

26. What arrangement of cells is called a series connection ?

.....

.....

27. What arrangement of cells is called 'a parallel connection' ?

.....

.....

28. What is the advantage of arranging the cells in :

(*a*) Series : .....

(*b*) Parallel : .....

29. (*a*) State 'Ohm's Law of Resistance.'

.....

.....

(*b*) Write the formula to find the current in the circuit.

.....

30. What is meant by electrical resistance of conductor ?

.....

.....

31. (*a*) Name the unit in which electrical resistance is measured : .....

.....

(*b*) Define that unit.

.....

32. Give two examples of substances which are :

(*a*) Good conductors of electricity : .....

(*b*) Good insulators : .....

33. What is resistor ?

.....

.....

34. What is the relationship between the strength of electric current (I), its potential difference (V) and the resistance (R) ?

.....

35. Deduce a formula for the amount of heat produced by an electric current in a circuit.

.....

36. If V=220 Volts and I=0·5 Ampere, how much will be the resistance ?

.....

37. A bathroom heater draws 5 A when operating from a 220 V line What is its resistance in operation ?

.....

.....

38. What potential difference is required to allow a current of 4 A to flow in a load whose resistance is 20 Ohms ?

.....

.....

39. Write the formula of Ohm's Law of Resistance in :

(*a*) Series : .....

(*b*) Parallel : .....

40. Resistors of 1, 2 and 3 Ohm's are connected in series and parallel. Calculate the equivalent resistance in each case.

(*a*) .....

.....

(*b*) .....

.....

41. Compute the effective resistance when three resistors 2, 4 and 8 Ohm's are connected in parallel and in series.

(*a*) .....

(*b*) .....

42. What do you understand by 'heating effect of electric current' ?

.....

.....

43. Why does a conductor get heated when a current flows through it ?

.....

.....

44. What amount of heat will be produced if a current of 1 A flows through a resistor of resistance R Ohm's for T seconds ?

.....

45. Name four electrical appliances that are based upon the heating effect of electric current :

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

46. (*a*) What is the unit of electrical power ?

.....

(*b*) State units in which it is measured.

.....

47. Define each of the following terms :

(*a*) Watt : .....

.....

(*b*) Kilo-Watt : .....

.....

(*c*) Kilo-Watt-hour : .....

.....

48. What is the relation between Watt and Kilowatt ?

.....

49. Establish the relation between Joule and Kilowatt hour.

.....

50. Show that 1 KWh is equal to $3{\cdot}6 \times 10^6$ Joules.

.....

.....

51. In a house four 60 W electric bulbs are lighted for 4 hours daily. Calculate the energy consumed in 30 days.

.....

.....

52. An electric heater draws a current of 10 A from 220 V supply. What is the cost of using the heater for 2 hours everyday for 30 days ? The cost of 1 unit (1 KWh) is 60 paise.

.....

.....

53. A 1000 W heater draws a current of 4 A. What is the supply voltage ? How much electricity is consumed in 30 days if the heater is used 2 hours a day ?

54. An electric bulb has a rating 200 W, 200 V and it is used for 6 hours daily for 30 days. Calculate the cost of electricity consumed at 60 paise per KWh.

55. An electric heater is rated 2 KW and 220 Volts. Calculate the energy consumed in 1 hour.

56. A radioset of 60 W runs for 60 hours. How much electrical energy is consumed ?

57. Find the energy consumed by 2 electric fans of 60 W each which operate on an average for 5 hours daily.

58. Calculate the cost of electricity consumed in boiling water in an electric kettle of 1500 W. Water starts boiling in 12 minutes and cost of electricity is 60 paise per unit.

59. What happens when electric current is passed through a compass needle ?

60. What is meant by magnetic lines of forces ?

61. Explain Maxwell 'right hand grip rule'.

.....

.....

62. (*a*) What is a Solenoid ?

.....

.....

(*b*) Sketch the magnetic field pattern due to a solenoid carrying current.

63. On what factors does the strength of an electric magnet depend ?

(*a*) .....

(*b*) .....

(*c*) .....

64. State and explain the rule which gives the direction of a magnetic field due to a straight current carrying conductor.

.....

.....

65. Explain with the help of a diagram 'Fleming's left hand thumb rule'.

66. On what principle does an electric motor work ?

.....

.....

67. Why are more coils used in a motor ?

.....

.....

68. What is the difference between a Permanent magnet and an Electric magnet ?

	Permanent magnent	*Electric magnet*
(*a*)	.....	.....
(*b*)	.....	.....

69. Explain the workin g of a D.C. motor.

.....

.....

.....

.....

70. State one function of each of the following in an electric motor :

(*a*) Split rings : .....

(*b*) Brushes : .....

71. Mention three practical applications of an electric motor in our daily life :

(*a*) .....

(*b*) .....

(*c*) .....

72. What is meant by 'Electromagnetic induction' ?

.....

.....

73. Name a device that converts mechanical energy into electrical energy.

.....

74. (*a*) What is a generator ?

.....

.....

(*b*) What runs a generator ?

.....

75. What is an A.C. dynamo ?

.....

.....

76. On what principle does a dynamo work ?

.....

.....

77. Distinguish between A.C. and D.C.

A.C.	*D.C.*
.....	.....
.....	.....

78. What is a transformer ?

.....

.....

79. Distinguish between a step-up and a step-down transformer :

Step-up transformer	*Step-down transformer*
(*a*)	.....
(*b*)	.....
.....	.....

80. Why is transformer used in A.C. only ?

.....

.....

81. Name two types of transformers :

(*a*) ..... (*b*) .....

82 Make a list of atleast five stations where we have :

	Hydroelectric stations	*Thermal stations*	*Atomic power stations*
(*a*)	.....	.....	.....
(*b*)	.....	.....	.....
(*c*)	.....	.....	.....
(*d*)	.....	.....	.....
(*e*)	.....	.....	.....

83. What is the difference in the ampereage of domestic line and power line ?

.....

84. What do the following wires signify ? How will you identify them ?

(*a*) Live wire : .....

.....

(*b*) Neutral wire : .....

.....

(*c*) Earth wire : .....

.....

85. (*a*) What is a main switch ?

.....

.....

(*b*) What is its function ?

.....

86. Apart from good insulation, state two other safety precautions which are kept in mind during electrical wiring of buildings.

(*a*) .....

(*b*) .....

87. (*a*) What is meant by short circuit ?

.....

.....

(*b*) How does it occur ?

.....

(*c*) Why it is dangerous ?

.....

.....

88. (*a*) What is a fuse ?

.....

(*b*) What happens to the fuse when a large current is drawn through it ?

.....

(*c*) Can we use the same fuse wire for different circuits ?

.....

(*d*) Which metal is used for making fuse ?

.....

89. What does the blowing off of an electric fuse indicate ?

.....

.....

90. (*a*) What is meant by over-loading in an electric supply ?

.....

.....

(*b*) How can it be prevented ?

.....

.....

91. What are the main causes of short circuits and over heating in an electric supply ?

(*a*) ..... (*b*) ..... (*c*) .....

92. Write four safety measures you would adopt to avoid electric hazards :

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

93. What are neurons ?

.....

94. How does a neuron produce electricity ?

.....

.....

.....

95. Name two animals which make use of electro-chemical mechanism for their defence.

(*a*) ..... (*b*) .....

96. Explain the electro-chemical mechanism in Eel's body.

.....

.....

.....

97. Many electrical appliances and circuits are earthed. What is the reason for this ?

.....

.....

98. Why do electricians wear rubber gloves or shoes while working ?

.....

.....

99. What are the contributions of the following scientists ?

(*a*) A. M. Ampere .....

(*b*) C. A. Coulomb .....

(*c*) M. Faraday .....

(*d*) J. Henry .....

(*e*) J. P. Joule .....

OBJECTIVE TYPE QUESTIONS

100. Fill in the blanks :

(*a*) The unit of electric current is.....

(*b*) Ohm's Law establishes a relation between potential difference and.....

(*c*) 1 KWh is equal to..... .....Joules.

(*d*) Energy spent in the electric circuit=.....×Ampere×.....

(*e*) Practical unit of power is.....

(*f*) A fuse is a piece of wire of.....resistance and..... melting point.

(*g*) Core of an electro-magnet is made of.....

(*h*) In an electric motor.....energy is converted into..... energy.

(*i*) .....is used to measure electric current in a circuit.

(*j*) Voltameter is joined in.....connection.

101. Write true or false against each of the following statements :

(*a*) Potential difference is necessary for an electric current to flow. ( )

(*b*) The splitting ring of a motor is called commutator. ( )

(*c*) An ammeter is always connected in series. ( )

(*d*) A transformer can work on a direct current. ( )

(*e*) A voltameter has a very small resistance. ( )

(*f*) A fuse should have high resistance and low melting point. ( )

(*g*) 746 W is equal to 1 Horse power. ( )

(*h*) The unit of resistance is Watt. ( )

(*i*) Rubber is an excellent insulator. ( )

(*j*) Red wire brings in the current in a supply line. ( )

102. Match the items in Column I with those in Column II.

Column I	*Column II*
(*a*) Alloy of lead and tin	ammeter
(*b*) Series connection	voltameter
(*c*) Parallel connection	Ohm
(*d*) Volt/ampere	Maxwell
(*e*) Right hand grip rule	Fuse
	Fleming

103. Choose the right answer from each of the following :

1. What is the unit of electric power ?
   (*a*) Volt (*b*) Watt (*c*) Coulomb (*d*) KWh

2. $3{\cdot}6 \times 10^6$ Joules of energy represent :
   (*a*) 1 W (*b*) 1 Wh (*c*) 1 KWh (*d*) 1 H.P.

3. The electrical energy consumed is measured by an instrument called
   (*a*) ammeter (*b*) Voltameter (*c*) Ohm-meter (*d*) lactometer

4. A 30 Ohm and a 60 Ohm resistors are connected in series. The combined resistance of the two resistors in Ohm is :
   (*a*) 20 (*b*) 30 (*c*) 90 (*d*) 180

5. Permanent magnets are made of :
   (*a*) Al (*b*) Cu (*c*) Alnico (*d*) Steel

6. In electrical terminology earthing is a conductor connected to :
   (*a*) The earth (*b*) An insulator (*c*) A tree (*d*) None

7. A safety fuse must be connected in series with :
   (*a*) Live wire (*b*) Earth wire (*c*) Neutral wire (*d*) None

8. The device used to measure potential difference is called :
   (*a*) Ammeter (*b*) Voltameter (*c*) Galvanometer (*d*) Hydrometer

9. The phenomenon of production of an electric current in a circuit with the help of a magnet is called :
   (*a*) Magnetisation (*b*) Electrification
   (*c*) Electro-magnetic induction (*d*) Electrolysis

10. How many Gauss make one Tesla ?
    (*a*) 10 (*b*) 100 (*c*) 1000 (*d*) 10000

□□

15
Ways of Living

1. (*a*) Define the term 'habitat'.

.....

.....

(*b*) Why dose an organism need a suitable habitat ?

.....

(*c*) How will you differentiate habitat from environment ?

.....

.....

2. What are the two main components of an ecosystem ?

(*a*) ..... (*b*) .....

3. What are the physical components of an ecosystem ?

.....

4. What are the biotic components of an ecosystem ?

.....

5. Why are Himalayan forests best suited for tigers ?

.....

.....

6. Why can't you grow coconut and the banana in Ladakh region ?

.....

7. What do you understand by the term 'microhabitat' ?

.....

.....

8. List four physical conditions which will determine the nature of a habitat.

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

9. In what ways are desert rats different from field rats ?

	Desert rats	*Field rats*
(*a*)	.....	.....
(*b*)	.....	.....
(*c*)	.....	.....

10. (*a*) Why do desert rats make burrows deep in the ground ?

.....

(*b*) Why do they come out only at night ?

.....

11. Abiotic factors or physical factors are limiting factors in an ecosystem. Explain.

.....

.....

12. Two species in a habitat depend on each other for their welfare. Explain with the help of a suitable example.

.....

.....

.....

13. (*a*) What is egret ?

.....

(*b*) Why does it take a ride on the buffalo ?

.....

(*c*) How is it beneficial to the buffalo ?

.....

14. (*a*) What is rhizobium ?

.....

(*b*) Name four plants in which it can be detected.

(*i*) ..... (*ii*) ..... (*iii*) ..... (*iv*) .....

(*c*) How does it benefit the host plant ?

.....

15. (*a*) What are parasites ?

.....

(*b*) How do they differ from saprophytes ?

.....

.....

16. (*a*) Name two parasites of man :

(*i*) ..... (*ii*) .....

(*b*) Give names of their carriers :

(*i*) ..... (*ii*) .....

17. (*a*) What are ectoparasites ?

.....

(*b*) In what way do they differ from endoparasites ?

.....

.....

(*c*) Give an example of each of these parasites :

(*i*) ..... (*ii*) .....

18. Name three main types of habitats :

(*a*) ..... (*b*) ..... (*c*) .....

19. Give the meaning of the following terms :

(*a*) Aquatic habitat : .....

.....

(*b*) Terrestrial habitat : .....

.....

(*c*) Aerial habitat : .....

.....

(*d*) Arboreal habitat : .....

.....

(e) Amphibians : .....

.....

20. Write three examples of each of the following :

(a) Aquatic animals : .....

(b) Terrestrial animals : .....

(c) Arboreal animals : .....

(d) Amphibians : .....

21. (a) Where are the tropical forests located in India ?

.....

(b) Mention the typical flora and fauna found in this zone :

(i) Flora : ..... (b) Fauna : .....

(c) Why do we find a great variety of organisms in these forests ?

.....

.....

22. How is a predator different from the prey ?

.....

.....

23. Identify predators and prey from the following animals :

snake, frog, deer, mosquito, lizard.

(a) Predators : ..... (b) Preys : .....

24. (a) Where do water hyacinth grow ?.....

(b) How does it affect the population of other life-forms ?

.....

.....

25. (a) What is adaptation ?

.....

.....

(b) How does it help an organism ?

.....

.....

26. Why are naturally occurring ecosystems balanced well ?

.....

.....

27. What are the main physical factors influencing aquatic organisms ?

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

28. In what ways do the following equip themselves to survive in their environment ?

(*a*) Water hyacinth : .....

(*b*) Hydrilla : .....

(*c*) Vallisnaria : .....

(*d*) Lizard : .....

29. Name three of the most common adaptations of the fresh water plants :

(*a*) ..... (*b*) ..... (*c*) .....

30. Why are fresh water forms not found in sea water ?

....

31. (*a*) What is the habitat of algae ?

.....

(*b*) Name two blue green algae : .....

.....

(*c*) Why are these absent in oceans ?

.....

32. What are the adaptations in a fish body to lead an aquatic life ?

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

33. What are the four main physical factors influencing land organisms ?

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

34. How will you convince your friend that land is a discontinuous habitat ?

.....

.....

35. Explain the following terms :

(*a*) Xeric habitats : .....

.....

(*b*) Mesic habitats : .....

.....

36. (*a*) Why is buffalo also called water buffalo ?

.....

(*b*) What is its microhabitats ?

.....

(*c*) Why does it love to wallow in mud and water ?

.....

(*d*) Why is it not advisable to keep buffaloes in deserts ?

.....

37. How does the orchid plant adapt itself to changes in temperature and humidity ?

.....

.....

38 Name three of the most common adaptations of terrestrial plants ;

(*a*) ..... (*b*) ..... (*c*) .....

39. Give a short account of adaptations shown by chameleon.

.....

.....

.....

40. Write two differences between lizard and chameleon

	Lizard	*Chameleon*
(*a*)	.....	.....
(*b*)	.....	.....

41. (*a*) What are deserts ?

.....

(*b*) Name some of the deserts of the world : .....

(*c*) Name a few plants and animals found in deserts :

(*i*) Plants : ..... (*ii*) Animals : .....

42. What are the adaptations of plants and animals in desert zone ?

(*a*) Plants : .....

(*b*) Animals : .....

43. (*a*) Why is the camel called the 'ship of the desert' ?

.....

.....

(*b*) How is the body of camel adapted to live in xeric conditions ?

(*i*) .....

(*ii*) .....

(*iii*) .....

(*c*) What is the importance of hump in his body ?

.....

44. How does camel economise on its need for water ?

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

45. Why do desert plants have reduced leaves ?

.....

46. How does camel adjust its body temperature to its surroundings ?

.....

.....

.....

47. (*a*) What are cold-blooded animals ?

.....

.....

(*b*) How do they regulate their body temperature according to their surroundings ?

.....

.....

(*c*) In which seasons are they more active and why ?

.....

(*d*) Write four examples of ectothermal animals :

(*i*) ..... (*ii*) .... (*iii*) ..... (*iv*) .....

48. How do xeric plants prevent loss of water ?

.....

49. Why are more cows found in dry and hot habitat than in moist places ?

.....

.....

50. What are the means by which organisms survive low freezing temperature ?

(*a*) .....

(*b*) .....

51. What protects the body of water plants against decay ?

.....

52. What are the adaptations of plants and animals in polar regions ?

(*a*) Plants : .....

(*b*) Animals : .....

53. How do adaptations occur in nature ?

.....

54. Explain the following terms :

(*a*) Natural selection : .....

.....

(*b*) Survival of the fittest : .....

.....

55. What type of problems has man created for himself in the environment ?

(*a*) .....

(*b*) .....

(*c*) .....

56. How are birds adapted for flight ?

(*a*) .....

(*b*) .....

(*c*) .....

57. How has man become the most important part of his biosphere ?

.....

.....

58. How does manipulation of environment by man lead to alteration of habitat of other organisms ?

.....

.....

.....

59. What measures do you suggest for effective use of habitat ?

(*a*) .....

(*b*) .....

(*c*) .....

60. What is hibernation ?

.....

61. Why do animals hibernate ?

.....

62. What is the main cause of floods in our country ?

.....

63. (*a*) What is silting ?

.....

(*b*) What is the main cause of this evil ?

.....

(*c*) How is silting threatening our dams ?

.....

.....

OBJECTIVE TYPE QUESTIONS :

64. Fill in the blanks :

(*a*) The banana and coconut grow abundantly in.....

(*b*) .....rats are nocturnal in their habit.

(*c*) Peas, beans and pulses have.....in their roots.

(*d*) Tapeworm and plasmodium are human.....

(*e*) Hydrilla, lemna and algae are.....plants.

(*f*) Spirogyra and Ulothrix generally grow in.....

(*g*) All fishes respire through.....

(*h*) The body of the fish is.....which helps her in.....

(*i*) Buffaloes give thinner milk when it is.....

(*j*) The.....forests of India are full of plants and animals.

65. Indicate whether the following statements are true or false ?

(*a*) Habitat is the dwelling place of an organism. ( )

(*b*) Field rats are smaller than desert rats. ( )

(*c*) Tick birds eat lice, ticks from the body of animals. ( )

(*d*) Plasmodium is carried by female anopheles mosquitoes. ( )

(*e*) Frogs, toads and salamanders are aquatic animals. ( )

(*f*) Water hyacinth is a weed. ( )

(*g*) Vallisnaria have narrow and long leaves. ( )

(*h*) Land is a continuous habitat. ( )

(*i*) The chameleon is a reptile like lizard. ( )

(*j*) Lizard can not change its colour like chameleon. ( )

66. Write scientific terms for each of the following statements :

(*a*) Organisms that live and breed in water : .....

(*b*) Organisms that live and propagate on land : .....

(*c*) Organisms that live on trees and branches : .....

(*d*) Organisms that live both on land as well as water : .....

(*e*) Organisms that can regulate their body temperature according to their surroundings :

.....

67. Choose the right answer from the following :

1. Which of the following is not an ectothermal animal ?
   (*a*) Lizard (*b*) Snake (*c*) Hydra (*d*) Earthworm

2. During severe winter animals undergo :
   (*a*) Hibernation (*b*) Aestivation (*c*) Perrenation (*d*) None

3. Which of the following animals have hump for storing fat ?
   (*a*) Buffalo (*b*) Cows (*c*) Camel (*d*) Tiger

4. Which one of the following can change its colour according to surroundings ?
   (*a*) Lizard (*b*) Cobra (*c*) Chameleon (*d*) Viper

5. The microhabitat of water buffalo is :
   (*a*) Wet lands (*b*) Dry lands (*c*) Marshy lands (*d*) Saline lands

6. Birds are adapted for flight because they have :
   (*a*) Light bones (*b*) Hollow bones (*c*) Streamlined body (*d*) All

7. Land is a discontinuous habitat because of the presence of :
   (*a*) Streams (*b*) Rivers (*c*) Mountains (*d*) All

8. Which one of the following acts as rudder in fishes while swimming ?
   (*a*) Dorsal fins (*b*) Ventral fins (*c*) Tail fins (*d*) None

9. Spirogyra algae do not grow in oceans because of :
   (*a*) Poor light (*b*) High salt contents (*c*) Low temperature (*d*) All

10. Which of the following is not an amphibian ?
    (*a*) Frog (*b*) Crocodile (*c*) Fish (*d*) Toad

□ □

16

Bird Life; Learning Through Observation

1. Define the term 'species'.

.....

.....

2. A species is a group of similar organisms. Write an improvement for this poor definition of species.

.....

.....

3. State six characteristics of birds :

(*a*) ..... (*b*) .....

(*c*) ..... (*d*) .....

(*e*) ..... (*f*) .....

4. How many different species of birds are known in :

(*a*) The world : ..... (*b*) India : .....

5. What are the most important characteristics that you would look for in identifying a bird ?

(*a*) ..... (*b*) .....

(*c*) ..... (*d*) .....

(*e*) ..... (*f*) .....

6. Name four varieties of chickens on the basis of their colours :

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

7. How can you identify a male house sparrow from a female one ?

.....

.....

8. How many kinds of crows do you observe in nature ?

.....

9. Which standardised procedure do we use for estimating bird species diversity ?

.....

10. How many different kinds of species are you expected to observe in the following habitats :

(*a*) In a town : ..... (*b*) Open sandy beach : .....

(*c*) Complex habitat : ..... (*d*) Thick evergreen forests : .....

11. Why do we observe maximum number of species in a complex habitat consisting of water marsh with fields and trees around ?

.....

.....

12. What is 'community of birds' for an ecologist ?

.....

.....

13. What is an ecological niche ?

.....

.....

14. (*a*) What is the niche of the common crow ?

.....

(*b*) What is the niche of an egret ?

.....

15. Why do sandy sea beaches permit the existence of only 10-15 species.

.....

.....

16. Name nine common birds of our country. :

(*a*) ..... (*b*) ..... (*c*) .....

(*d*) ..... (*e*) ..... (*f*) .....

(*g*) ..... (*h*) ..... (*i*) .....

17. (*a*) Name two species of crows found in India : .....

.....

(*b*) What do they eat ? .....

.....

18. What are the advantages of long, slender and curved beaks ?

(*a*) .....

(*b*) .....

19. Name three birds which have strong curved beaks :

(*a*) ..... (*b*) ..... (*c*) .....

20. (*a*) What are nocturnal birds ?

.....

(*b*) Name two such birds which are found in India : .....

.....

(*c*) What is the most interesting feature of adaptation in these birds ? .....

.....

21. (*a*) Who are called 'birds of prey' ?

.....

(*b*) Name two such birds you are familiar with : .....

.....

22. (*a*) Why does coppersmith have short, broad wings ?

.....

.....

(*b*) Name two other birds which have short, broad wings : .....

.....

23. (*a*) What type of wings do swallows have ?

.....

(*b*) What is the advantage of such wings to these birds ?

.....

24. How do short and broad wings help the bulbul or the babbler ?

.....

.....

25. How is the tail helpful to birds during flight ?

(*a*) .....

(*b*) .....

26. What is the most notable feature of black drongo ?

.....

27. What are the advantages of the long, forked, tail for the black drongo ?

(*a*) .....

(*b*) .....

28. What is the advantage of long legs for cattle egret ?

.....

.....

29. What are nest parasites ? Give an example.

.....

.....

30. (*a*) Why is 'Koel' called the nest parasite ?

.....

(*b*) Where does she keep her eggs for hatching ? .....

.....

(*c*) What is the function of crows in hatching Koel's eggs ?

.....

31. (*a*) Where will you find weaverbird's nests ?

.....

.....

(*b*) Why do these nests occur in colonies ?

.....

.....

(*c*) What is the function of male weaverbird during breeding ?

.....

32. Name four birds which make their nests in natural holes :

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

33. (*a*) What are nidifugous birds ?

.....

.....

(*b*) Give two examples of such birds : .....

34. (*a*) What are nidicolous birds ?

.....

.....

(*b*) Give two examples of such birds. .....

Distinguish between the newiy hatched chicks of nidifugous birds and nidicolous birds :

Nidifugous birds	*Nidicolous birds*
(*a*)	.....
(*b*)	.....
(*c*)	.....

36. (*a*) What do you understand by the term roosting as applicable to birds ?

.....

.....

(*b*) Why do birds roost ?

.....

37. Name two birds which roost during day time : .....

.....

38. Name a bird which roosts :

(*a*) Solitarily : .....

(*b*) In small groups : .....

(*c*) In large aggregations : .....

39. Why do birds roost in such large aggregations ? Give three advantages.

(*a*) .....

(*b*) .....

(*c*) .....

40. (*a*) What is meant by bird migration ?

.....

.....

(*b*) Why do birds migrate ?

.....

(*c*) In which months of the year do these birds migrate during winter : .....

.....

41. Write the names of four winter migrant birds :

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

42. Explain the term 'mobbing' in relation to common crow.

.....

.....

43. When do birds give alarm calls ?

.....

.....

44. What is the difference between mating call and the alarm call ?

.....

.....

45. Name two birds which give alarm calls on seeing birds of prey :

(*a*) ..... (*b*) .....

46. (*a*) Who wrote an exhaustive book on the Indian birds ? .....

.....

(*b*) By whom was this book published ? .....

.....

47. What is the contribution of Dr. Salim Ali ?

.....

48. Explain in brief the line transect method for determining the diversity of the bird population in a defined area.

.....

.....

.....

.....

49. Bird life sanctuaries are being established and maintained in large parts of our country. Mention the usefulness of these sanctuaries :

(*a*) .....

(*b*) .....

(*c*) .....

50. Name three places in India where bird sanctuaries are located.

(*a*) ..... (*b*) ..... (*c*) .....

51. Name a bird which catches flying insects and bees : .....

52. Name a bird which can imitate the calls of other birds : .....

53. What species of birds do often roost together ? .....

OBJECTIVE TYPE QUESTIONS

54. Fill in the blanks :

(*a*) Dr.....wrote a book on.....birds.

(*b*) Migratory birds arrive in the month of.....and return in.....

(*c*) .....roost in very large aggregations.

(*d*) Mynas, parakeets make their nests in.....

(*e*) .....is a nest parasite.

(*f*) The bee-eater has a long.....with two elongated.....

(*g*) The.....bird gets its name from "kuk kuk" call.

(*h*) .....are versatile birds which consume practically everything.

(*i*) Sunbirds have long....., ...beaks.

(*j*) 1200 species of birds are present in.....

55. Indicate if the following statements are true or false ?

(*a*) Black drongo can imitate the calls of other birds. ( )

(*b*) 900 bird species are residents of India. ( )

(*c*) Birds like human beings rely on sight and sound. ( )

(*d*) Koels roost in small groups. ( )

(*e*) Nidifugous birds are nest-dwelling. ( )

(*f*) All relatives of Koel are nest-parasites. ( )

(*g*) The birds of prey have vicious claws. ( )

(*h*) The bulbul feeds on berries. ( )

(*i*) Nocturnal birds possess binocular vision. ( )

(*j*) Roseringed parakeet flies in flocks over large areas. ( )

56. Match the items in Column I with those in Column II.

Column I	*Column II*
(*a*) Nidifugous	Spotted owlet
(*b*) Nidicolous	Dr. Salim Ali
(*c*) Nocturnal	Bharatpur
(*d*) The Indian birds	Nest-dwelling
(*e*) Bird sanctuary	Nest-fleeing
	Chandigarh

57. Choose the right answer from the following :

1. The total number of birds species known in India is :
   (*a*) 300 (*b*) 900 (*c*) 1200 (*d*) 2400
2. One of the following is not the bird of prey :
   (*a*) Kites (*b*) Sunbird (*c*) Spotted owlet (*d*) Barn owl
3. Which one of the following differ in moving pattern from the rest :
   (*a*) Coppersmith (*b*) Bulbul (*c*) Swallow (*d*) Babbler
4. One of the following have short, broad wings :
   (*a*) Swallows (*b*) Swifts (*c*) Bulbuls (*d*) Owls
5. Which bird has the long forked tail ?
   (*a*) Black drongo (*b*) Coppersmith (*c*) Crow (*d*) Pigeon
6. One of the following bird uses great skill and workmanship in making its nest :
   (*a*) Parakeet (*b*) Weaverbird (*c*) Crows (*d*) House sparrows
7. Birds roost in large numbers to :
   (*a*) receive warmth (*b*) become alert (*c*) get information (*d*) all
8. Winter migratory birds arrive in India in :
   (*a*) Aug.-Sept. (*b*) Sept.-Oct. (*c*) Oct.-Nov. (*d*) Nov.-Dec.
9. The bird which roosts in very large aggregation is :
   (*a*) Koel (*b*) Myna (*c*) Tailor bird (*d*) Owl
10. Koel keeps her eggs for hatching in the nest of :
    (*a*) Pigeon (*b*) Crow (*c*) Owl (*d*) Weaverbird

□□

17

Organization in the Living World

1. (*a*) Define the term metabolism.

.....

.....

(*b*) Name two aspects of metabolism :

(*i*) ..... (*ii*) .....

(*c*) In what ways do the above two aspects of metabolism differ from each other ?

.....

.....

2. (*a*) What do the following terms mean ?

(*i*) Unicellular :

.....

(*ii*) Multicellular :

.....

(*b*) Name three unicellular organisms :

(*i*) ..... (*ii*) ..... (*iii*) .....

3. Name three multicellular organisms :

(*a*) ..... (*b*) ..... (*c*) .....

4. (*a*) What is meant by levels of organization ?

.....

.....

(*b*) What are the two categories of levels of organization ?

(*i*) ..... (*ii*) .....

5. Define each of the following terms :

(*a*) Population :

.....

.....

(*b*) Community :

.....

.....

(*c*) Ecosystem :

.....

.....

(*d*) Biosphere :

.....

.....

6. Arrange the following into the higher hierarchy of organization :

biosphere, individual, ecosystem, community, population.

.....

7. (*a*) Name the highest level of living world organization : .....

.....

(*b*) What is the starting point for studying higher levels of organization ? .....

.....

8. Define the following terms :

(*a*) Cell :

.....

(*b*) Tissue :

.....

(*c*) Organ :

.....

(*d*) Organ system :

.....

9. Arrange the following in increasing order in the organizational hierarchy :
organ system, molecules, tissues, cell, organ.

.....

10. Mention the different levels of organization in the hierarchy of :

(*a*) Higher levels : .....

(*b*) Lower levels : .....

11. Which is the most important and fundamental level in the living world organization ? .....

.....

12. What is the average size range of the majority of cells ?

.....

13. Name the :

(*a*) Smallest cell : ..... (*b*) Largest cell : .....

14. Name the longest cell of the human body. .....

15. What is the unit of measurement used for measuring the size of a cell ? .....

.....

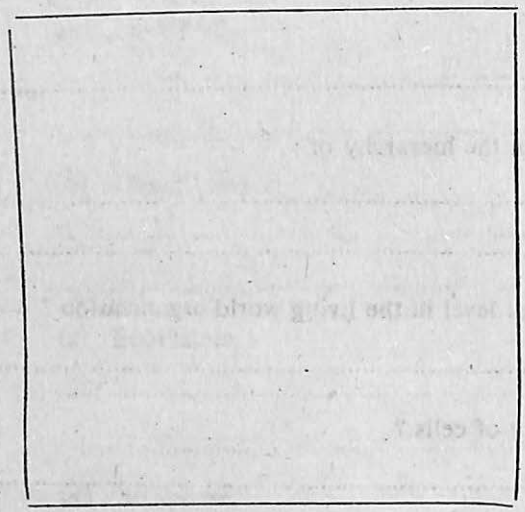
16. Name two unicellular animal cells which keep on changing their shape constantly :

(*a*) ..... (*b*) .....

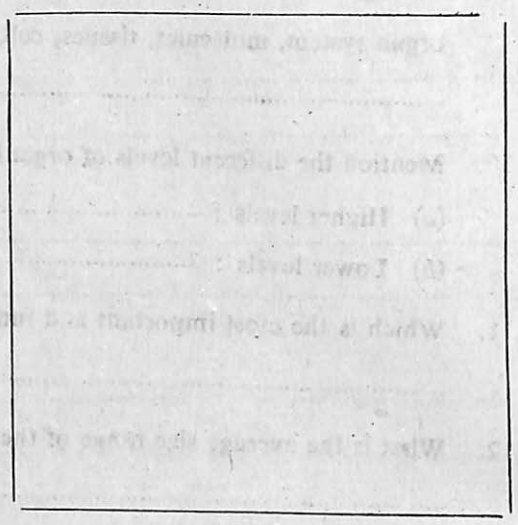
17. Differentiate between the following pairs of terms :

(*a*)	*Population*	*Community*
	.....	.....
	.....	.....
(*b*)	*Ecosystem*	*Biosphere*
	.....	.....
	.....	.....
(*c*)	*Organ*	*Organelle*
	.....	.....
	.....	.....

18. Draw a neat labelled diagram of a plant cell and an animal cell.



A Plant cell



An animal cell

19. (*a*) State two uses of compound microscope :

(*i*) .....

(*ii*) .....

(*b*) Name six parts of a compound microscope :

(*i*) ..... (*ii*) ..... (*iii*) .....

(*iv*) ..... (*v*) ..... (*vi*) .....

(*c*) When do we use high power objective of the microscope ?

.....

(*d*) What advantage do transmission electron microscope have over light microscope ?

.....

20. Name three most important parts of the cell which are common to both plant and animal cells.

(*a*) ..... (*b*) ..... (*c*) .....

21. Draw a neat and labelled diagram to show the structure of a plant cell as viewed under an electron microscope.

22. (*a*) Which cells—plants or animals—possess cell wall ?.....

(*b*) What is the main component of the cell wall ? .....

(*c*) Is cell wall living or dead ? .....

(*d*) What important functions does the cell wall perform for the plant cell ?

(*i*) .....

(*ii*) .....

23. (*a*) What is the cell membrane ?

.....

(*b*) Name the other alternative name of cell membrane : .....

(*c*) What is its location in :

(*i*) Animal cell : ..... (*ii*) Plant cell : .....

(*d*) Why is cell membrane called selectively permeable membrane ?

.....

.....

(*e*) Why is plasma membrane so important for a living cell ?

(*i*) .....

(*ii*) .....

24. State two important differences between the cell wall and the cell membrane.

	Cell wall	*Cell membrane*
(*a*)	.....	.....
(*b*)	.....	.....

25. (*a*) What are cell organelles ?

.....

.....

(*b*) Name four important organelles found in a cell.

(*i*) ..... (*ii*) ..... (*iii*) ..... (*iv*) .....

(*c*) What do you understand by the term 'cell inclusions' ?

.....

.....

(*d*) Name four cell inclusions of a plant cell.

(*i*) ..... (*ii*) ..... (*iii*) ..... (*iv*) .....

26. (*a*) What is cytoplasm ?

.....

(*b*) What structures do you find in the cytoplasm of a cell :

(*i*) ..... (*ii*) ..... (*iii*) ..... (*iv*) .....

(*c*) Where is nucleus present in a cell ?

.....

(*d*) What does nucleus contain ? (*i*) ..... (*ii*) .....

(*e*) When does chromatin become chromosomes ?

.....

(*f*) Which part of the cell organelle bears genes ? .....

27. (*a*) What are genes ?

.....

(*b*) Where are they located in a cell ?

.....

(*c*) What is the function of genes ?

.....

(*d*) Define 'Genetics'.

.....

28. (*a*) Name the cell organelle that is commonly called cell's power house.

.....

(*b*) What does mitochondria contain ?

.....

(*c*) Why are the mitochondria called the 'power house of the cell' ?

.....

.....

29. (*a*) Which cell organelle is exclusively found in a plant cell ?

.....

(*b*) What are plastids ?

.....

(*c*) Which part of the chloroplast is capable of trapping solar energy ?

.....

(*d*) Why are chloroplast called 'kitchen of the cell' ?

.....

.....

30. What is the equivalent term used for Golgi bodies in plant cells ?

.....

31. (*a*) What are vacuoles ?

.....

(*b*) In which cells do they prominently occur ?

.....

(*c*) What does the vacuole contain ?

.....

32. The endoplasmic reticulum remains in continuation with nuclear membrance. What possible advantage does this arrangement give to the cell ?

.....

.....

33. What are the roles of the following components in a cell ?

(*a*) Endoplasmic reticulum : .....

(*b*) Ribosomes : .....

(*c*) Golgi bodies : .....

(*d*) Mitochondria : .....

(*e*) Lysosomes : .....

(*f*) Nucleus : .....

(*g*) Vacuole : .....

(*h*) Plastids : .....

(*i*) Nucleolus : .....

(*j*) Spindle : .....

34. What are centrioles and where are they located ?

.....

.....

35. What are centrosomes and where are they located ?

.....

.....

36. Write any four differences between a plant cell and an animal cell :

	Plant cell	*Animal cell*
(*a*)	.....	.....
(*b*)	.....	.....
(*c*)	.....	.....
(*d*)	.....	.....

37. Differentiate between the following terms :

(*a*)	*Chromatin*	*Chromosome*	*Chromatid*
	.....	.....	.....
	.....	.....	.....
(*b*)	*Centriole*	*Centromere*	*Chiasma*
	.....	.....	.....
	.....	.....	.....

38. (*a*) What are cilia ?

.....

(*b*) What are flagella ?

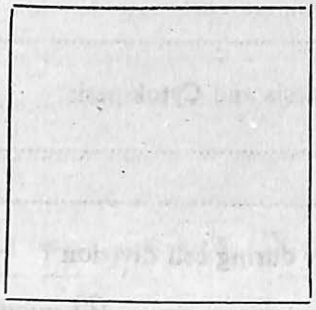
.....

(*c*) What functions do cilia and flagella perform for the cell ?

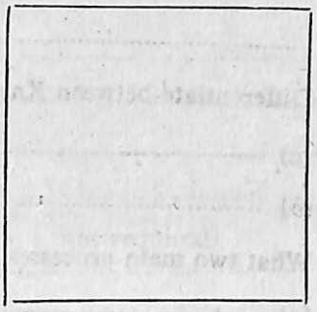
.....

39. Draw diagram showing the general structure of each of the following :

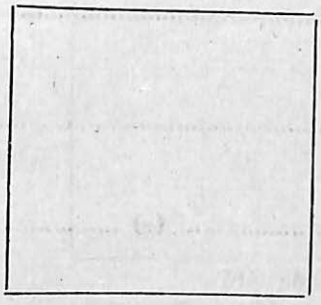
Nucleus



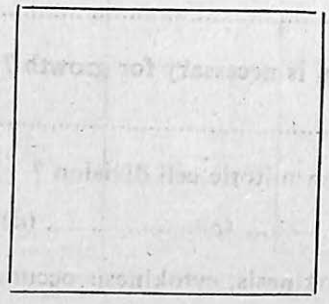
Mitochondria



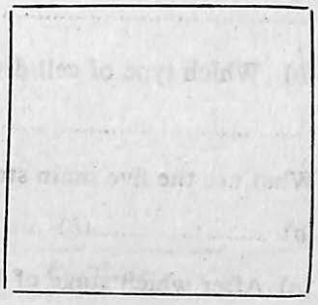
Chloroplast



Golgi body



Endoplasmic reticulum



Chromosomes

40. Name the process which is responsible for the formation of new cells from the pre-existing ones.

.....

41. (*a*) What is cell division ?

.....

.....

(*b*) Why is cell division important for all individuals ?

.....

(*c*) Name two common modes of cell divisions :

(*i*) ..... (*ii*) .....

42. (*a*) Who coined the term 'mitosis' ?

.....

(*b*) Define the term 'mitosis'.

.....

(*c*) Where does mitosis take place in animals ?

.....

43. Differentiate between Karyokinesis and Cytokinesis.

(*a*) .....

(*b*) .....

44. What two main processes occur during cell division ?

(*a*) ..... (*b*) .....

45. (*a*) What type of cell division occurs in zygote for increase in the number of cells ?

.....

(*b*) Which type of cell division is necessary for growth ?

.....

46. What are the five main stages in mitotic cell division ?

(*a*) .....(*b*) ..... (*c*)..... ..... (*d*) ..... (*e*) .....

47. (*a*) After which stage of karyokinesis, cytokinesis occurs ?

.....

(*b*) What event causes conversion of chromatin into chromosomes ?

.....

48. Name the stage in which the following changes occur during mitosis :

(*a*) Formation of spindle fibres and ester : ....

(*b*) Arrangement of chromosomes on the equatorial plate : .....

(*c*) Reappearance of nuclear membrane : .....

(*d*) Condensation of chromatin into chromosomes : .....

(*e*) Separation of chromatids and their movement towards opposite poles : .....

.....

49. Describe in short the chromosome behaviour during the following stages of mitosis :

(*a*) Interphase : .....

.....

(*b*) Prophase : .....

.....

(*c*) Metaphase : .....

.....

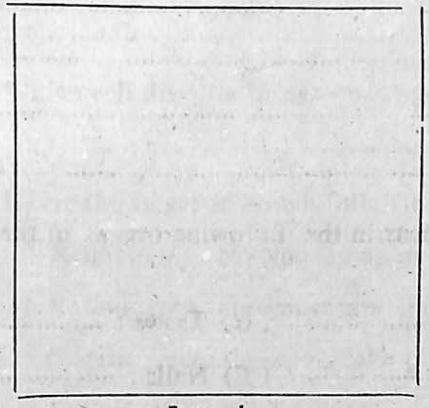
(*d*) Anaphase : .....

.....

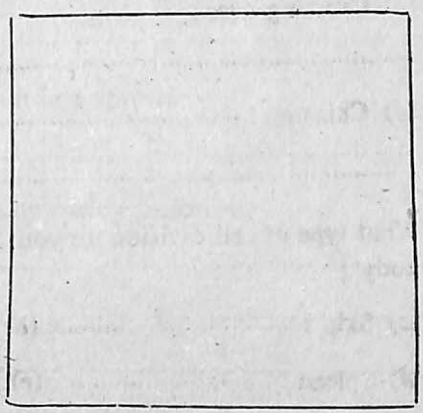
(*e*) Telophase : .....

.....

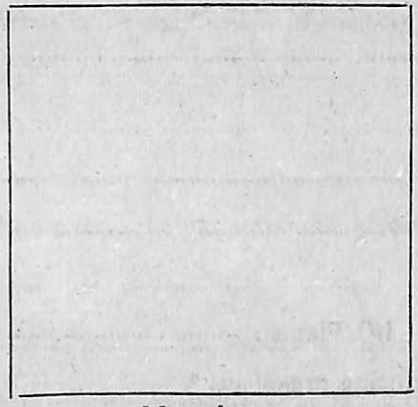
50. Draw and label the different stages of mitosis. (Description is not required).



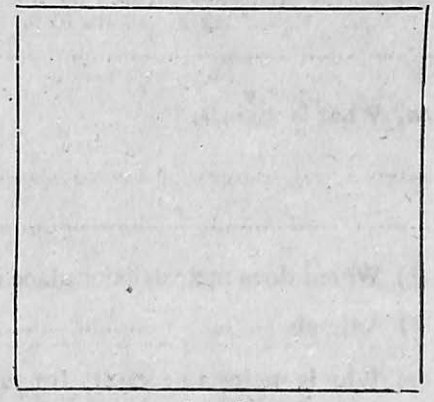
Interphase



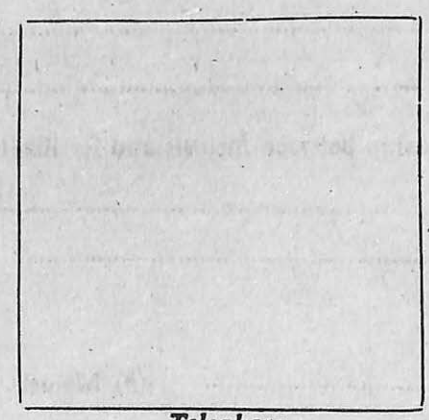
Prophase



Metaphase



Anaphase



Telophase

51. Explain the following terms :

(*a*) Diploid : .....

.....

(*b*) Haploid : .....

.....

(*c*) Crossing over : .....

.....

(*d*) Chiasma : .....

.....

52. What type of cell division do you expect to occur in the following organs of the human body :

(*a*) Skin : ..... (*b*) Liver : ..... (*c*) Testes : .....

(*d*) Spleen : ..... (*e*) Ovaries : ..... (*f*) Nails : .....

53. Name the structure formed by the fusion of male and female gametes.

.....

54. (*a*) What is meiosis ?

.....

.....

(*b*) Where does meiosis take place in :

(*i*) Animals : ..... (*ii*) Plants : .....

(*c*) Why is meiosis necessary for sexually reproducing organisms ?

.....

.....

(*d*) What is the relationship between meiosis and fertilization ?

.....

.....

55 What is the result of :

(*a*) Mitosis : ..... (*b*) Meiosis : .....

56. Why is meiosis termed reductional division ?

.....

.....

57. Which cell division is responsible for the formation of gametes ?

.....

58. At what stage does meiosis occur in sexually reproducing diploid organisms ?

.....

59. Which cell division brings about genetic variation in a species ?

.....

60. Name the stages in which following changes occur during meiosis :

(*a*) Reduction in chromosomes number : .....

(*b*) Homologous chromosomes start pairing up : .....

(*c*) Genetic recombination take place : .....

(*d*) Individual chromatids move towards the poles : .....

61. What is the significance of meiosis in the life cycle of an organism ?

(*a*) .....

(*b*) .....

(*c*) .....

62. Name the different stages of meiosis.

.....

.....

63. Draw labelled diagrams showing the process of meiosis in an animal cell.

64. What are homologous chromosomes ?

.....

.....

65. Give the number of chromosomes in each of the following :

(*a*) Mouse : ..... (*b*) Potato : .....

(*d*) Dog : ..... (*c*) Man : .....

66. Which type of cell division will take place in the following processes ?

(*a*) Healing of a wound : .....

(*b*) Regeneration of the tail of a lizard : .....

(*c*) Formation of pollens : .....

(*d*) Formation of sperms : .....

(*e*) Formation of an egg : .....

67. What is the significance of mitosis ?

(*a*) .....

(*b*) .....

(*c*) .....

68. State four differences between mitosis and meiosis.

	Mitosis	*Meiosis*
(*a*)	.....	.....
(*b*)	.....	.....
(*c*)	.....	.....
(*d*)	.....	.....

69. (*a*) What is genetic recombination ?

.....

.....

(*b*) How does it take place during meiosis ?

.....

.....

70. Distinguish between the following pairs of terms :

(*a*)	*Haploid*	*Diploid*
	.....	.....
(*b*)	*Spindle*	*Ester*
	.....	.....
(*c*)	*Centriole*	*Centromere*
	.....	.....

71. (*a*) What are identical twins ?

.....

.....

(*b*) How are they formed ?

.....

.....

72. What are fraternal twins ?

.....

.....

73. How do fraternal twins differ from identical twins ?

.....

.....

74. (*a*) What is chiasmata ?

.....

.....

(*b*) What is its importance ?

.....

75. As a result of mitotic cell division a cell having 40 chromosomes gives rise to two daughter cells. What would be the number of chromosomes in each daughter cell ?

.....

76. A single cell has divided mitotically and resulted in the formation of 64 cells. How many mitotic divisions must have occurred ?

.....

OBJECTIVE TYPE QUESTIONS :

77. Fill in the blanks :

(*a*) The two major types of cell divisions are ..... and .....

(*b*) Chromosome number is ..... during meiosis.

(*c*) The four phases of mitosis are ....., ..., ..., and .....

(*d*) Every cell arises from a pre-existing .....

(*e*) Nuclear division is also called : .....

(*f*) Centromere get split into two in .....phase.

(*g*) In the telophase spindle apparatus .....

(*h*) ..... is made up of cellulose.

(*i*) The two main events of cell divisions are ..... and .....

(*j*) The first stage of karyokinesis is called .....

78. Are the following statements true or false ?

(*a*) In meiosis first division is a reduction division. ( )

(*b*) Gametes are formed as a result of mitosis. ( )

(*c*) A nerve cell is the longest animal cell. ( )

(*d*) The body of a sexually reproducing organism is diploid. ( )

(*e*) Exchange of chromosome segments occur during meiosis. ( )

(*f*) During interphase nucleus is metabolically very active. ( )

(*g*) Two dissimilar nuclei are formed during mitosis. ( )

(*h*) The synthesis of proteins in the cells occur at the ribosomes. ( )

(*i*) Plasma membrane is present in all the cells. ( )

(*j*) Plastid always contain coloured pigments. ( )

79. Write scientific terms for each of the following statements :

(*a*) Division of the nucleus : .....

(*b*) Division of the cytoplasm : .....

(*c*) A pair of similar chromosomes : .....

(*d*) Reshuffling of genes on the chromatids during meiosis : .....

(*e*) Each longitudinal half of a chromosome : .....

(*f*) An organism possessing a single set of chromosomes (N) : .....

(*g*) An organism possessing two sets of chromosomes (2 N) : .....

(*h*) Export firm of the cell : .....

(*i*) Power house of the cell : .....

(*j*) Kitchen of the cell : .....

80. Match the items in Column I with those in Column II.

Column I	*Column II*
(*a*) Haploid	Nuclear division
(*b*) Karyokinesis	Genes
(*c*) Cell wall	Single set of chromosomes
(*d*) Chromosomes	Walther Flemming
(*e*) Meiosis	Robert Hooke
	Cellulose

81. Choose the right answer from the following :

1. Ribosomes play a significant role in :
   (*a*) Photosynthesis (*b*) Lipid synthesis (*c*) Protein synthesis (*d*) None
2. The nuclear membrane and nucleoli become indistinguishable during :
   (*a*) Telophase (*b*) Metaphase (*c*) Prophase (*d*) Anaphase
3. All the activities of the cell are controlled by :
   (*a*) Cytoplasm (*b*) Nucleus (*c*) Protoplasm (*d*) Mitochondria
4. Which one of the following cell structure is non-living ?
   (*a*) Ribosome (*b*) Chromosome (*c*) Cell wall (*d*) Cell membrane
5. A group of cells performing a particular function is called a/an :
   (*a*) Organ (*b*) Tissue (*c*) Organ system (*d*) Organism
6. Which one of the following is called the 'power house of the cell' ?
   (*a*) Mitochondria (*b*) Ribosomes (*c*) Lysosomes (*d*) Vacuoles

□ □

18

Life Processes–I

1. (*a*) How will you define the science of 'physiology' ?

.....

.....

(*b*) Name four physiological processes operating in our body :

(*i*) ..... (*ii*) ..... (*iii*) ..... (*iv*) .....

2. In order to perform metabolic activities of life, an organism requires energy. How does it obtain energy ?

.....

3. Explain the meaning of the term 'nutrition'.

.....

.....

4. Name the two modes of nutrition found amongst living organisms.

(*a*) ..... (*b*) .....

5. (*a*) What is autotrophic nutrition ?

.....

.....

(*b*) What is heterotrophic nutrition ?

.....

.....

6. What are the two ways in which a heterotroph derives its food ?

(*a*) ..... (*b*) .....

7. (*a*) What is saprophytic mode of nutrition ?

.....

.....

.....

(*b*) How will you explain the parasitic mode of nutrition ?

.....

.....

8. What is holozoic mode of nutrition ?

.....

.....

9. Name two animals having following mode of nutrition :

(*a*) Saprophytic : .....

(*b*) Parasitic : .....

(*c*) Holozoic : .....

(*d*) Autotrophic : .....

10. State two points of difference in nutrition between each of the following pairs :

(*a*)	*Autotrophic*	*Heterotrophic*
(*i*)	.....	.....
(*ii*)	.....	.....
(*b*)	*Holophytic*	*Holozoic*
(*i*)	.....	.....
(*ii*)	.....	.....
(*c*)	*Parasitic*	*Saprophytic*
(*i*)	.....	.....
(*ii*)	.....	.....

11. Name the type of nutrition in each of the following :

(*a*) Green plants : ..... (*b*) Fungi : .....

(*c*) Mushroom : ..... (*d*) Tapeworm : .....

(*e*) Plasmodium : ..... (*f*) Man : .....

12. Write the meaning of the following terms :

(*a*) Ingestion : .....

.....

(*b*) Digestion : .....

.....

(*c*) Absorption : .....

.....

(*d*) Egestion : .....

.....

3. Write down the names of the following :

(*a*) The part of the gut in which cellulose is digested : .....

(*b*) The part of the gut in which water is absorbed : .....

(*c*) The organ in which saliva is produced : .....

(*d*) The organ in which bile is produced : .....

(*e*) The part of the gut in which food is absorbed : .....

14. (*a*) What are enzymes ?

.....

(*b*) State two main characteristics of enzymes :

(*i*) .....

(*ii*) .....

15. (*a*) What is the function of mouth in digestion ?

.....

(*b*) What is saliva ? .....

(*c*) Which enzyme is present in saliva ? .....

16. (*a*) What is the importance of HCl in the stomach of higher mammals ?

.....

(*b*) Name two enzymes of gastric juice : .....

(*c*) What are the three enzymes present in the pancreatic juice ?

(*i*) ..... (*ii*) ..... (*iii*) .....

17. (*a*) In what part of the food canal does absorption take place ?

.....

(*b*) What useful role do villi play in the small intestine ?

.....

18. What happens to digested food after absorption ?

.....

19. State two functions of bile juice :

(*i*) .....

(*ii*) .....

20. Name the organs which secrete the following enzymes :

(*a*) Amylase : ..... (*b*) Rennin : .....

(*c*) Trypsin : ..... (*d*) Lipase : .....

21. Name two digestive glands of mammals :

(*i*) ..... (*ii*) .....

22. Trace the path of a piece of bread from the mouth till it is egested out as waste from the body.

.....

.....

.....

.....

23. What are the steps involved in the release of energy from the food ?

(*a*) .....

(*b*) .....

24. (*a*) What is photosynthesis ?

.....

.....

(*b*) Write an equation in chemical symbols for the change that occurs during photosynthesis.

.....

(*c*) What are the raw materials needed for photosynthesis ?

.....

25. How does heterotrophic organisms depend upon autotrophic organisms ?

.....

.....

26. What is the compensation point in photosynthesis ?

.....

.....

27. How do water and carbon dioxide enter a leaf during photosynthesis ?

.....

.....

28. What are the two sets of reactions involved in photosynthesis ?

(*a*) ..... (*b*) .....

29. (*a*) What is the basic role of light during photosynthesis ?

.....

(*b*) What is the source of oxygen produced during photosynthesis ?

.....

(*c*) What is the first important stable product formed during CO_2 fixation ?

.....

(*d*) To what use does a plant put all the sugar formed during photosynthesis ?

.....

.....

30. (*a*) Which cell organelle is associated with photosynthesis ? .....

.....

(*b*) Name four components of chlorophyll :

(*i*) ..... (*ii*) ..... (*iii*) ..... (*iv*) .....

(*c*) Which components of chlorophyll do participate in the transfer of energy ?

.....

(*d*) Which colour of the spectrum of light is most effective for photosynthesis ?

.....

31. Under what conditions would the rate of photosynthesis and respiration become equal ? Does this happen in nature ?

.....

.....

32. Describe an experiment to show that chlorophyll is necessary for photosynthesis with the help of a diagram.

.....

.....

.....

.....

33. How will you demonstrate that carbon dioxide is necessary for photosynthesis ? Draw a suitable diagram.

.....

.....

.....

.....

34. With the help of a diagram, describe an experiment to prove the necessity of light for photosynthesis ?

.....

.....

.....

.....

35. How will you prove experimentally that oxygen is evolved as a by-product in photosynthesis ? Draw a neat diagram.

.....

.....

.....

.....

36. What is meant by respiration ?

.....

.....

37. What are respiratory substrates ? Give two examples.

.....

.....

38. How is respiration different from breathing ?

	Respiration	*Breathing*
(*a*)	.....	.....
(*b*)	.....	.....

39. Name four different organs of respiration and mention the name of the organisms in which they are found.

Organs of Respiration	*Name of the Organisms*
(*a*)	.....
(*b*)	.....
(*c*)	.....
(*d*)	.....

40. Write three differences between respiration and combustion :

Respiration	*Combustion*
(*a*)	.....
(*b*)	.....
(*c*)	.....

41. What type of respiration occurs in the :

(*a*) Presence of O_2 : ..... (*b*) Absence of O_2 : .....

42. Write an equation to represent :

(*a*) Aerobic respiration : .....

(*b*) Anaerobic respiration : .....

43. What are the end products of :

(*a*) Aerobic respiration : ..... (*b*) Anaerobic respiration : .....

44. How many ATP molecules are produced in :

(*a*) Aerobic respiration : ..... (*b*) Anaerobic respiration : .....

45. What is the role of ATP in respiration ?

....

....

46. State four points of differences between respiration and photosynthesis :

Respiration	*Photosynthesis*
(*a*)	.....
(*b*)	.....
(*c*)	.....
(*d*)	.....

47. Why are ATP molecules known as 'energy currency' of the living cell ?

.....

.....

48. What are the two major steps involved in respiration ?

(*a*) .....

(*b*) .....

49. In which cell organelle does the entire process of respiration take place ?

.....

50. Define the term 'diffusion'.

.....

.....

51. In the space provided below, compare diffusion with osmosis :

	Diffusion	*Osmosis*
(*a*)	.....	.....
(*b*)	.....	.....

52. Name four animals in which transport of material occurs through diffusion :

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

53. What are the two processes involved in transporting materials in lower animals ?

(*a*) ..... (*b*) .....

54. (*a*) Why do leaves have larger surface area ?

.....

(*b*) Explain the phenomenon of diffusion with respect to gaseous exchange in a leaf.

.....

.....

.....

.....

55. Why do higher organisms have an elaborate mechanism of transport ?

.....

.....

56. Which tissue is responsible for the transport of :

(*a*) Water and minerals in the plants : .....

(*b*) Prepared food material in the plants : .....

57. (*a*) Name the structure through which most of the water is transpired from a plant ?

.....

(*b*) What is transpiration ?

.....

.....

58. (*a*) What is a stomata ?

.....

(*b*) Where are they located ?

.....

(*c*) What is their function ?

.....

(*d*) What governs the opening and closing of stomata ?

(*i*) ..... (*ii*) .....

(*e*) Draw a neat and labelled diagram of stomata ?

59. Name two processes which are responsible for internal distribution of water and minerals in a plant :

(*a*) ..... (*b*) .....

60. Define the term 'turgor pressure'.

.....

.....

61. How does water rise up in tall trees ?

.....

.....

62. Why is circulatory system also known as transport system in man ?

.....

.....

63. (*a*) What is blood ?

.....

(*b*) Name the four main components of blood :

(*i*) ..... (*ii*) ..... (*iii*) ..... (*iv*) .....

(*c*) What imparts red colour to the blood ? .....

.....

64. State one functions of each of the following :

(*a*) RBC : .....

(*b*) WBC : .....

(*c*) Platelets : .....

(*d*) Plasma : .....

(*e*) Lymph : .....

65. What is the function of haemoglobin ?

.....

66. State two differences between the following pairs of terms :

(*a*)	*Plasma*	*Blood*
	(*i*)	.....
	(*ii*)	.....
(*b*)	*Blood*	*Lymph*
	(*i*)	.....
	(*ii*)	.....

67. State five functions of blood :

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

(*e*) .....

68. What are the alternative names of the following :

(*a*) Red blood corpuscles : .....

(*b*) White blood corpuscles : .....

(*c*) Blood platelets : .....

69. What are the essential components of the circulatory system ?

(*a*) ..... (*b*) ..... (*c*) .....

70. Mention two differences between an artery and a vein :

	Artery	*Vein*
(*a*)	.....	.....
(*b*)	.....	.....

71. (*a*) What are capillaries ?

.....

(*b*) What are their functions ?

.....

72. (*a*) Which blood vessel carries blood under pressure ?

.....

(*b*) Why are arteries thick-walled and veins thin-walled ?

.....

.....

73. What is the difference between arterial blood and venous blood ?

.....

.....

74. Explain the working of human heart in about six lines.

.....

.....

.....

.....

.....

.....

75. How many times does the heart beat in a normal healthy person ?

.....

76. (*a*) When you visit your physician, he examines your wrist. Can you say what is he trying to feel ? .....

(*b*) What is the average pulse rate of a healthy person ?

.....

77. Name the :

(*a*) Artery which carries impure blood : .....

(*b*) Vein which carries pure blood : .....

78. By giving only the names of the parts, trace the route of blood from right auricle to the aorta.

Right auricle.....

.....Aorta

79. (*a*) Which kind of blood vessel is used for detecting pulse ? .....

.....

(*b*) Which part of the heart receives oxygenated blood from the lungs ?

.....

(*c*) Name four substances that are transported through circulatory system.

.....

80. What is the role of heart in blood circulation ?

.....

81. (*a*) What is systolic pressure ?

.....

(*b*) What is distolic pressure ?

.....

(*c*) What are their values for healthy heart of a resting person ?

(*i*) ..... (*ii*) .....

82. What are the advantages of having very thin and highly branched capillaries for blood flow ?

.....

.....

83. (*a*) Define excretion.

.....

.....

(*b*) Why must all living organisms excrete ?

.....

84. (*a*) What is the major nitrogenous waste of man ? .....

.....

(*b*) Name four excretory organs of man :

(*i*) ..... (*ii*) ..... (*iii*) ..... (*iv*) .....

85. (*a*) What are kidneys ?

.....

.....

(*b*) Where are they located in the human body ?

.....

.....

(*c*) Name the artery which brings oxygenated blood to the kidney :

.....

(*d*) Name the basic unit of kidney :

.....

(*e*) How many nephrons are there in the kidney ?

.....

(*f*) State three main functions of kidneys :

(*i*) .....

(*ii*) .....

(*iii*) .....

86. Draw a neat labelled diagram to show the structure of a nephron.

87. Name four substances which are reabsorbed with the blood from the nephron.

.....

88. Place the following organs in the correct sequence :

Ureter, urinary bladder, urethra, kidney, efferent arterioles.

....

89. Draw a lebelled diagram showing the kidneys and other associated organs of man.

90. Describe how urine is passed from the kidney to the outside of the body.

.....

.....

.....

.....

91. What would happen if our kidneys stop working ?

.....

.....

92. State one function of each of the following :

(*a*) Glomerulus : .....

(*b*) Bowman's capsule : .....

(*c*) Renal artery : .....

(*d*) Renal vein : .....

(*e*) Ureter : .....

93. (*a*) What is dialysis ?

.....

.....

(*b*) When does it become necessary for a person to undergo dialysis ?

.....

.....

94. What principle is used in the construction of artificial kidneys ?

.....

95. What should be done if a natural kidney is damaged in a healthy person ?

.....

.....

96. How does excretion take place in a plant ?

.....

.....

97. Place the following organs in the correct sequence :

Vein, heart, arteriole, venules, artery, capillary.

.....

OBJECTIVE TYPE QUESTIONS

98. Fill in the blanks :

(*a*) The elimination of metabolic waste from the body is called.....

(*b*) The colour of red blood cell is due to .....

(*c*) Arteries are.....elastic than veins.

(*d*) The largest blood vessel leaving the heart is called .....

(*e*) The two upper chambers of the heart are called .....

(*f*) Bile is made in the.....and stored in the .....

(*g*) Fungi, mould and yeast have.....mode of nutrition.

(*h*) .....are the photosynthetic organelle in plants.

(*i*) The rate of photosynthesis is highest in .....light.

(*j*) In photosynthesis..... .....energy is converted into.....energy.

99. Write true or false against each of the following statements :

(*a*) A neuron is the functional unit of kidney. ( )

(*b*) Capillaries form the junction between artery and vein. ( )

(*c*) In man heart beats about 72 times per minute. ( )

(*d*) Stomata are the organs of respiration in lower plants. ( )

(*e*) Gastric juice is the secretion of liver. ( )

(*f*) The bile makes the food alkaline and emulsifies fat. ( )

(*g*) The process of taking food is called nutrition. ( )

(*h*) Respiration is opposite of transpiration. ( )

(*i*) Respiration and photosynthesis balances one another at night. ( )

(*j*) The rate of diffusion is faster in gases.

100. Match the items in Column I with those in Column II.

Column I	*Column II*
(*a*) Digestive agents	Leucocytes
(*b*) Bile	Enzymes
(*c*) White blood corpuscles	Gall bladder
(*d*) Aerobic respiration	Ventricle
(*e*) Thin-walled chamber of the heart	38 ATP
	Auricle

101. Provide scientific terms for the following statements :

(*a*) Organisms capable of producing their own food :

....

(*b*) Organisms which derive their nutrition from others :

.....

(*c*) Organisms which depend upon other living things for nutrition :

.....

(*d*) The point at which respiration and photosynthesis are equal :

.....

(*e*) The component of the blood which acts as soldier of the body :

.....

(*f*) The form in which energy is stored in the body :

.....

(*g*) Organisms which can respire in the presence of O_2 only :

.....

(*h*) The process by which plants lose water into the atmosphere :

.....

(*i*) The removal of metabolic waste from the body :

.....

(*j*) The process of breaking down of complex molecules into simpler ones :

.....

102. Choose the right answer from the following :

1. Valves to prevent backward flow of blood are present in :
   (*a*) Artery (*b*) Veins (*c*) Heart (*d*) Arterioles
2. Urine is stored before its elimination in the :
   (*a*) Ureter (*b*) Urethra (*c*) Urinary bladder (*d*) Nephron
3. The blood plasma from which fibrinogen has been removed is called
   (*a*) Plasma (*b*) Serum (*c*) Lymph (*d*) Blood
4. Our body is protected by :
   (*a*) RBCs (*b*) WBCs (*c*) Platelets (*d*) Plasma
5. The enzyme which is present in the saliva is :
   (*a*) Ptyalin (*b*) Trypsin (*c*) Pepsin (*d*) Rennin
6. The digestion of food in the stomach takes place in a medium which is :
   (*a*) Acidic (*b*) Alkaline (*c*) Neutral (*d*) None

□□

19

Life Processes–II

1. (*a*) What do you understand by the term 'growth' ?

.....

.....

(*b*) Why do living things grow and reproduce ?

.....

2. Name the three basic processes involved in growth :

(*a*) ..... (*b*) ..... (*c*) .....

3. Explain the following terms with respect to growth :

(*a*) Cell division : .....

.....

(*b*) Cell elongation : .....

.....

(*c*) Cell maturation : .....

.....

4. How do you distinguish between plant growth and an animal growth ?

	Plant growth	*Animal growth*
(*a*)	.....	.....
(*b*)	.....	.....
(*c*)	.....	.....

5. Define the term 'development' as applied to growth in plants.

.....

.....

6. (*a*) Define the term 'reproduction' in your own words.

.....

.....

(*b*) Why do living things reproduce ?

(*i*) .....

(*ii*) .....

(*c*) What are the two main types of reproduction known to you ?

(*i*) ..... (*ii*) .....

7. Distinguish between asexual and sexual reproduction :

	Asexual Reproduction	*Sexual Reproduction*
(*a*)	.....	.....
(*b*)	.....	.....

8. What are the different types of asexual reproduction ? Name them.

(*a*) ..... (*b*) .....

(*c*) ..... (*d*) .....

9. Explain the following terms :

(*a*) Fission : .....

.....

(*b*) Budding : .....

.....

(*c*) Fragmentation : .....

.....

(*d*) Spore formation : .....

.....

10. State the method by which the following organisms reproduce :

(*a*) Amoeba : ..... (*b*) Hydra : .....

(*c*) Yeast : ..... (*d*) Spirogyra : .....

(*e*) Mucor : ..... (*f*) Fern : .....

11. What is meant by vegetative propagation ?

.....

.....

12. State three advantages of vegetatively-grown crops :

(*a*) .....

(*b*) .....

(*c*) .....

13. Mention two disadvantages of vegetative propagation :

(*a*) .....

(*b*) .....

14. Name four methods of vegetative propagation commonly used by orchadists :

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

15. Name two plants which are propagated by the following methods :

(*a*) Budding : ..... (*b*) Stem cuttings : .....

(*c*) Fragmentation : ..... (*d*) Root cuttings : .....

(*e*) Bulbs : ..... (*f*) Adventitious roots : .....

(*g*) Tuber : ..... (*h*) Grafting : .....

(*i*) Rhizome : ..... (*j*) Layering : .....

16. Name the method by which following plants can be propagated vegetatively :

(*a*) Grasses : ..... (*b*) Spirogyra : .....

(*c*) Potato : ..... (*d*) Ginger : .....

(*e*) Onion : ..... (*f*) Rose : .....

(*g*) Mint : ..... (*h*) Bougainvillea : .....

(*i*) Jasmine : ..... (*j*) Mango : .....

(*k*) Bryophyllum : ..... (*l*) Garlic : .....

17. Write short notes on the following :

(*a*) Cuttings : .....

.....

(*b*) Grafting : .....

.....

(*c*) Layering : .....

.....

18. (*a*) What is a scion ?

.....

(*b*) What is a stock ?

.....

(*c*) How do they combine in their activities in a graft ?

.....

.....

19. (*a*) What is a tissue culture in plants ?

.....

.....

(*b*) Name three plants which are now grown by this method :

(*i*) ..... (*ii*) ..... (*iii*) .....

20. What do you call to the gametes in :

(*a*) Males : ..... (*b*) Females : .....

21. (*a*) What is a hermaphrodite ?

.....

(*b*) Give two examples :

(*i*) ..... (*ii*) .....

22. State two advantages of sexual reproduction :

(*a*) .....

(*b*) .....

23. (*a*) Which is the reproductive part of the plant ? .....

(*b*) Name two parts of the flower that take part in sexual reproduction :

(*i*) ..... (*ii*) .....

(*c*) What is a stamen ?

.....

(*d*) What is a pistil ?

.....

(*e*) Name three parts of a pistil :

.....

(*f*) What are pollen grains ?

.....

(*g*) Where are pollens produced ?

.....

(*h*) What are ovules ?

.....

(*i*) Where are ovules present in a flower ?

.....

(*j*) What is the function of style in a flower ?

.....

24. Draw a neat labelled diagram of a flower and show sepals, petals, stamens and pistils in it.

25. Draw a labelled diagram showing the structure of an ovule.

26. Define the following terms in your own words :

(*a*) Pollination : .....

.....

(*b*) Self-pollination : .....

.....

(*c*) Cross-pollination : .....

.....

27. State two advantages of cross-pollination :

(*a*) .....

(*b*) .....

28. State two disadvantages of cross-pollination :

(*a*) .....

(*b*) .....

29. (*a*) What is meant by fertilization in a flowering plant ?

.....

.....

(*b*) Where does fertilization take place ?

.....

30. Name four agents which enable the pollens to reach the stigma of the flower :

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

31. How does fertilization occur in a flowering plant ? Explain.

.....

.....

.....

.....

32. Give the functions of the following parts of the flower :

(*a*) Sepals : .....

(*b*) Petals : .....

(*c*) Stamens : .....

(*d*) Carpels : .....

33. What happens to each of the following after fertilization in the flower ?

(*a*) Petals : ..... (*b*) Ovary wall : .....

(*c*) Ovary : ..... (*d*) Ovule : .....

(*e*) Sepals : ..... (*f*) Zygote : .....

34. What is a fruit ?

.....

35. (*a*) What is external fertilization ?

.....

.....

(*b*) What is meant by internal fertilization ?

.....

.....

(*c*) Which of the two processes of fertilization is better for a living organism and why ?

.....

.....

36. Name three animals in which fertilization is :

(*a*) Internal : .....

(*b*) External : .....

37. (*a*) At what age do girls reach puberty ?

.....

(*b*) At what age do boys reach puberty ?

.....

38. State four changes that occur in males and females after attaining sexual maturity :

	Males	*Females*
(*a*)	.....	.....
(*b*)	.....	.....
(*c*)	.....	.....
(*d*)	.....	.....

39. Draw a neat labelled diagram of the male reproductive system of man and show the following parts.

Testes, Vas deferens, Epididymis, Penis, Seminal vesicles.

(*a*) State the function of each part labelled above :

(*i*) .....

(*ii*) .....

(*iii*) .....

(*iv*) .....

(*b*) Where do you find the seminiferous tubules ?

.....

(*c*) Where do you find interstitial cells ?

.....

(*d*) Which cells of the testes nourish the spermatogonia ?

.....

(*e*) What is the name of the male copulatory organ ?

.....

(*f*) Where does maturation of sperms take place ?

.....

(*g*) How long do sperms remain active after ejaculation ?

.....

40. Trace the path travelled by a sperm from the testes to its release from the body.

.....

.....

.....

.....

41. (*a*) What is semen ?

.....

(*b*) What does it contain ?

.....

(*c*) Name the gland the secretion of which forms seminal plasma ?

.....

42. Draw a neat labelled diagram of a sperm.

43. Draw a neat labelled diagram of the female reproductive system of human beings.

44. State one function of each of the following :

(*a*) Ovary : .....

(*b*) Oviduct : .....

(*c*) Uterus : .....

(*d*) Vagina : .....

(*e*) Vulva : .....

45. What is ovulation ?

.....

46. (*a*) What is menstrual cycle ?

.....

.....

(*b*) When does the first menstrual cycle occur in human females ?

.....

(*c*) What does menstrual flow contain ?

.....

(*d*) What is the normal duration of menstrual cycle ?

.....

47. (*a*) What happens to the ovum if it is not fertilized ?

.....

(*b*) What happens to the ovum if it is fertilized ?

.....

48. (*a*) When is a woman said to be pregnant ?

.....

(*b*) State four changes that take place in the body of a pregnant lady :

(*i*) .....

(*ii*) .....

(*iii*) .....

(*iv*) .....

49. (*a*) What is placenta ?

.....

.....

(*b*) What is its function ?

.....

(*c*) What technical term is used for child birth ?

.....

50. State two main characteristics of human reproductive system.

(*a*) .....

(*b*) .....

51. Why do males remain reproductive active throughout their life ?

.....

.....

52. (*a*) What are test tube babies ?

.....

.....

(*b*) What are the hazards in producing test tube babies ?

(*i*) .....

(*ii*) .....

53. How does a sperm differ from an ovum ?

.....

.....

54. Where does the fertilized ovum get embedded in human females ?

.....

55. By which structure is the foetus attached to its mother ?

.....

56. (*a*) What is the function of umblical cord ?

.....

(*b*) Where is it present ?

.....

57. What are the methods by which pregnancy can be prevented ?

(*a*) .....

(*b*) .....

(*c*) .....

58. (*a*) What is vasectomy ? How is it done ?

.....

.....

(*b*) What is tubectomy ? How is it done ?

.....

.....

59. What is homeostasis ?

.....

.....

60. What are the substances which co-ordinate the functioning of various plant organs and organ systems ? .....

61. Explain the term 'control and co-ordination' as applicable to multicellular organisms.

.....

.....

62. (*a*) What are plant hormones ?

.....

.....

(*b*) Why are plant hormones called growth regulators ?

.....

.....

(*c*) In which part of the plant does synthesis of auxin take place ?

.....

63. Name the four important group of plant-growth regulators :

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

64. Write two functions of each of the following phytohormones :

(*a*) Auxins : (*i*) .....

(*ii*) .....

(*b*) Gibberellins : (*i*) .....

(*ii*) .....

(*c*) Cytokinins : (*i*) .....

(*ii*) .....

(*d*) Abscissic acid : (*i*) .....

(*ii*) .....

65. Name one plant hormone which regulates cell elongation ? .....

66. Which growth regulator would you use to promote seed germination ?

.....

67. Which plant hormone would you use to promote :

(*a*) Early rooting in stem cuttings : .....

(*b*) Flowering in a long day plant : .....

(*c*) Leaf fall : .....

(*d*) To break dormancy of seeds : .....

(*e*) Ripening of fruits : .....

68. State four important applications of phytohormones in horticulture :

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

69. Name two systems which control and co-ordinate the internal environment of our body.

(*a*) ..... (*b*) .....

70. (*a*) What are endocrine glands ?

.....

.....

(*b*) What does the secretion of an endocrine gland contain ?

.....

(*c*) List the various endocrine glands of the human body.

(*i*) ..... (*ii*) .....

(*iii*) ..... (*iv*) .....

(*v*) ..... (*vi*) .....

71. Draw a simple outline of the human body and show the location of the above mentioned endocrine glands in it.

72. (*a*) Which endocrine gland is called the master gland of the body ?

.....

(*b*) What is the location of pituitary gland in the body ?

.....

(*c*) Why is pituitary gland called the master gland of the body ?

.....

(*d*) Name four hormones secreted by the pituitary gland :

(*i*) ..... (*ii*) ..... (*iii*) ..... (*iv*) .....

73. Name the hormone produced by the following glands :

(*a*) Thyroid : ..... (*b*) Pancreas : .....

(*c*) Adrenal : ..... (*d*) Pituitary : .....

(*e*) Ovary : ..... (*f*) Testes : .....

74. How are endocrine glands different from exocrine glands :

Endocrine glands	*Exocrine glands*
(*a*)	.....
(*b*)	.....

75. Expand the following abbreviations :

(*a*) ADH : ..... (*b*) ACTH : .....

(*c*) FSH : ..... (*d*) TSH : .....

76. Name the hormone that :

(*a*) Helps in pregnancy : .....

(*b*) Utilises dietry iodine : .....

(*c*) Helps to overcome stress and strain : .....

(*d*) Helps to perform daring feat in circus : .....

(*e*) Regulate salt and water balance of the body fluids : .....

77. (*a*) Why are endocrine glands sometimes called as ductless glands ?

.....

.....

(*b*) Which blood vessel—a vein or an artery—carries the hormone ?

.....

78. State the effects of under secretion of :

(*a*) Thyroxin : .....

(*b*) Insulin : .....

79. Briefly describe the feedback control operated by some hormones in our body.

.....

.....

.....

.....

80. (*a*) Name the structural and functional unit of nervous system : .....

(*b*) Name three types of neurons : .....

(*c*) Draw a neat and well-labelled diagram of a typical neuron cell.

81. State two main functions of the human nervous system :

(*a*) .....

(*b*) .....

82. Name two main components of the central nervous system of man :

(*a*) ..... (*b*) .....

83. (*a*) Where is the brain of man located ?

(*b*) Name three main regions of a mammalian brain :

(*i*) ..... (*ii*) ..... (*iii*) .....

(*c*) Which is the largest part of the brain ?

84. What is spinal cord and where is it located ?

.....

.....

85. Distinguish between a motor and a sensory nerve :

Motor nerve	*Sensory nerve*
.....	.....
.....	.....

86. Which part of the human brain is concerned with :

(*a*) Intelligence : .....

(*b*) Equilibrium : .....

(*c*) Heart beats : .....

(*d*) Accurate movements : .....

(*e*) Feeling of consciousness : .....

87. What do you mean by reflex action ?

.....

.....

88. What are the components of reflex arc ?

.....

.....

89. What is the nature of nerve impulse ? .....

90. Draw a well-labelled diagram to show the specialized areas of the cerebrum.

91. State two examples of reflex action studied by you :

(*a*) ..... (*b*) .....

92. State the events occurring in a reflex action such as coughing.

.....

.....

93. What are the various functions of the human brain ?

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

(*e*) .....

94. State two functions of each of the following parts of the brain :

(*a*) Cerebral cortex : (*i*) .....

(*ii*) .....

(*b*) Cerebellum : (*i*) .....

(*ii*) .....

(*c*) Cerebrum : (*i*) .....

(*ii*) .....

(*d*) Spinal cord : (*i*) .....

(*ii*) .....

95. The amount of brain in an animal is a measure of its intelligence. Discuss.

.....

.....

.....

OBJECTIVE TYPE QUESTIONS

96. Fill in the blanks :

(*a*) The spinal cord is the centre of ..... action.

(*b*) The ..... is the seat of memory, reasoning and will.

(*c*) The ..... is the most prominent part of the brain.

(*d*) Endocrine glands secrete ..... directly into the .....

(*e*) ..... is exocrine as well as endocrine in function.

(*f*) The ovule forms ..... after fertilization.

(*g*) The fusion of a male gamete with an egg is called .....

(*h*) Menstrual cycle goes on upto the age of ..... in females.

(*i*) An ovum has only ..... chromosomes.

(*j*) Transfer of pollens on the stigma of a flower is termed .....

97. Indicate whether the following statements are true or false ?

(*a*) The medulla oblongata is nearest to the spinal cord. ( )

(*b*) Plants that reproduce asexually do not bear flowers. ( )

(*c*) Penis passes urine as well semen. ( )

(*d*) Oestrogen and progestron are secreted by the testes. ( )

(*e*) Meristematic tissues are absent in animals. ( )

(*f*) Yeast and hydra propagate by fission method. ( )

(*g*) An ovum is usually passive and larger in size. ( )

(*h*) Earthworm and hydra are hermaphrodite animals. ( )

(*i*) Release of ovum from the ovary is called ovulation. ( )

(*j*) Placenta forms a link between the mother and the embryo. ( )

98. Match the items in Column I with those in Column II.

Column I	*Column II*
(*a*) Vagina	budding
(*b*) Hydra	fragmentation
(*c*) Spirogyra	female genital opening
(*d*) Stamen	ovary
(*e*) Pistil	female urethral opening
	pollens

99. Provide scientific terms for each of the following :

(*a*) Permanent and irreversible increase in size, shape and weight : .....

(*b*) Stump of the tree on which grafting is done : .....

(*c*) An organism having both the sex organs : .....

(*d*) The male reproductive part of the flower : .....

(*e*) Master gland of the body : .....

100. Choose the right answer from each of the following :

1. The endocrine gland which controls all other endocrine glands is :
   (*a*) Thyroid (*b*) Pancreas (*c*) Pituitary (*d*) Adrenal
2. The deficiency of insulin leads to :
   (*a*) Goitre (*b*) Gigantism (*d*) Diabetes (*d*) Dwarfism
3. The discharge of the vascular lining of the uterus is termed :
   (*a*) Secretion (*b*) Ovulation (*c*) Gestation (*d*) Menstruation
4. Which one of the following is an accessory gland of the male reproductive system ?
   (*a*) Ovary (*b*) Testes (*c*) Uterus (*d*) Prostate
5. Nervous system consists of the basic unit called :
   (*a*) Neurons (*b*) Axons (*c*) Dendrities (*d*) Dendrons
6. Man is considered the most intelligent animal because he has the most developed :
   (*a*) Medulla oblongata (*b*) Cerebrum (*c*) Cerebellum (*d*) Spinal cord
7. Which one of the following is a reflex action ?
   (*a*) Thinking (*b*) Coughing (*c*) Exercise (*d*) Writing
8. Reflex actions are controlled by :
   (*a*) Spinal cord (*b*) Cerebelium (*c*) Cerebrum (*d*) Medulla oblongata
9. The hormone secreted by the pancreas is :
   (*a*) Adrenal (*b*) Insulin (*c*) Thyroxin (*d*) Oestrogen
10. The male gamete is termed as :
    (*a*) Ovum (*b*) Sperm (*c*) Zygota (*d*) Egg

20
Human Beings

1. Who suggested that man, monkeys and apes have a common ancestor ?

.....

2. (*a*) What are primates ?

.....

.....

(*b*) Name four primates : .....

3. What are chimpanzees, gorillas, gibbons and orangutans ? .....

4. State four characteristics of primates :

(*a*) ..... (*b*) .....

(*c*) ..... (*d*) .....

5. What are the differences in the body structure of an ape and a man ?

An Ape	*A Man*
(*a*)	.....
(*b*)	.....
(*c*)	.....
(*d*)	.....
(*e*)	.....

6. What advantage do human beings have in being bipedal ?

.....

7. Why can humans manipulate their hands much better than apes ?

.....

8. (*a*) Define the term dexterity.

.....

.....

(*b*) In what way is this property advantageous to humans ?

.....

9. Write the meaning of the following terms :

(*a*) Homo habilis : ..... (*b*) Homo erectus : .....

(*c*) Homo sapiens : .....

10. How do Homo sapiens differ from Homo erectus ?

.....

.....

11. Write three differences in the skulls of the following animals :

	Lemur	*Australopithecus*	*Homo sapiens*
(*a*)	.....	.....	.....
(*b*)	.....	.....	.....
(*c*)	.....	.....	.....

12. When did the following animals evolve on the earth ?

(*a*) Lemur : ..... (*b*) Southern ape : .....

13. Humans have certain advantages over other animals. Can you name three such advantages ?

(*a*) .....

(*b*) .....

(*c*) .....

14. Name two factors on which development of the brain of an animal depends.

(*a*) ..... (*b*) .....

15. What is the brain weight/body weight ratio of the following animals :

(*a*) Rat : ..... (*b*) Wolf : .....

(*c*) Chimpanzee : ..... (*d*) Man : .....

16. What can you measure with the ratio of brain weight/body weight of an organism ?

.....

17. Which organism has the largest brain/body weight ratio ?

.....

18. Why is man called the thinking animal ?

.....

19. Mention three capabilities that man is short of as compared to some other species of animals :

(*a*) .....

(*b*) .....

(*c*) .....

20. The development of human brain takes place at the cost of the other senses. Justify the statement.

.....

.....

.....

21. What are the four great landmarks in history of mankind ?

(*a*) ..... (*b*) .....

(*c*) ..... (*d*) .....

22. What is meant by a common ancestor ?

.....

.....

23. Explain what is pentadactyl limb ?

.....

24. Why did early man tame animals ?

(*a*) ..... (*b*) .....

25. (*a*) What is agriculture ?

.....

(*b*) Name few agricultural practices for which you need different tools.

(*i*) ..... (*ii*) ..... (*iii*) ..... (*iv*) .....

26. Briefly describe why agriculture is considered to be a technology that organised people.

.....

.....

.....

27. What does the loss of a tail lead to in apes and man ?

.....

.....

28. Why do sheep or bears have more wool or fleece ?

.....

.....

29. Write down nine items of equipment used by man about 5000 years ago :

(*a*)..... (*b*) ..... (*c*) .....

(*d*)..... (*e*) ..... (*f*) .....

(*g*)..... (*h*) ..... (*i*) .....

30. What were the materials used by the man to make these equipments ?

.....

31. What change in technology was observed by the following men ?

(*a*) Homo erectus .....

(*b*) Pleistocene man : .....

(*c*) Mesolithic man : .....

(*d*) Neolithic man : .....

32. With the help of a couple of familiar examples prove that the domestication of animals and cultivation of plants by man have affected evolution.

.....

.....

.....

33. (*a*) What are fossils ? .....

.....

(*b*) What information do we get from fossils ? .....

.....

34. What is the significance of wheel invention in the development of human civilization ?

.....

.....

.....

35. Name three tools of each of the following periods :

(*a*) Palaeolithic period : .....

(*b*) Neolithic period : .....

36. What are the benefits of erect posture to man ?

(*a*) .....

(*b*) .....

37. Man's power of speech is his special feature. Discuss.

.....

.....

.....

38. How did agriculture in the Neolithic period lead to improvement in community life ?

.....

.....

.....

39. Write two main characteristics of each of the following species of man :

(*a*) The Java Man : .....

(*b*) The Peking Man : .....

(*c*) The Neanderthal Man : .....

(*d*) The Rhodesian Man : .....

40. Mention four main factors that led to the establishment of civilization in the river valleys :

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

41. Name four countries where the early civilizations developed :

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

42. Name any five cities associated with the Indus valley civilization :

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) ..... (*e*) .....

43. (*a*) What do you know about the age of metals ?

.....

(*b*) What metals were discovered in this era ? .....

44. With the help of two examples prove that man has exploited the environment for his own benefit :

(*a*) .....

.....

(*b*) .....

.....

45. Large scale exploitation of environment by man is harmful for other living organisms. Justify the statement with the help of a suitable example.

.....

.....

.....

.....

46. What are the harmful effects of cutting down of forests on a large scale ?

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

47. Why is the use of aerosols banned by several countries ?

.....

.....

48. What is the importance of ozone layer around the earth ?

.....

49. Insecticides have helped in increasing our food production by killing insects, but their use is also harmful because of their ill effects on man's health. Justify.

.....

.....

.....

.....

50. What are biodegradable chemicals ?

.....

.....

51. Write short notes on :

(*a*) Chipko movement .....

.....

.....

(*b*) Silent Valley Project .....

.....

.....

52. How can we optimise the use of a given technology when it has both positive and negative aspects ?

.....

.....

.....

.....

53. A given technology has both positive and negative aspects attached to it. Justify the statement with the case of aerosols.

.....

.....

.....

.....

54. What steps do you suggest to protect our environment ?

(*a*) .....

(*b*) .....

55. Cherrapunji is no longer the wettest place in the world. Can you mention two reasons for this change ?

(*a*) .....

(*b*) .....

56. What were the characteristics of primitive farming ?

(*a*) .....

(*b*) .....

57. What do you understand by nomadic culture ?

.....

.....

58. What is the contribution of Charles Darwin ?

.....

OBJECTIVE TYPE QUESTIONS :

59 Fill in the blanks :

(*a*) Man.....and.....have a common ancestor.

(*b*) Lemur is monkey like animal with a.....tail.

(*c*) Man possesses.....vision.

(*d*) Humans can.....and.....year round.

(*e*) ....., ... and .....have same range of body weight.

60. Are the following statements true or false ?

(*a*) Homo erectus is a thinking man. ( )

(*b*) Man is bipedal because he can walk erect. ( )

(*c*) The lemur is the most ancient animal. ( )

(*d*) Humans have the most developed brain. ( )

(*e*) Tool-making flourishes in Australopithecus stage. ( )

□□

21

Science, Technology and Man

1. Explain the meaning of the term 'technology' in your own words.

.....

.....

2. How has new technology brought about changes in the way of life of man ?

.....

.....

.....

3. New technology increases the rate of development in an area. Justify the statement with the help of a suitable example.

.....

.....

.....

.....

4. What are the two ways, in which technology brings about changes in the human welfare ?

(*a*) .....

(*b*) .....

5. State two main characteristics of primitive agriculture.

(*a*) .....

(*b*) .....

6. How did man learn to preserve his food supplies for future use ?

(*a*) ..... (*b*) .....

7. What are the methods known to early man for food preservation ?

(*a*) ..... (*b*) .....

8. When and why did early man start taming and domesticating animals ?

.....

.....

9. (*a*) What information do we get from the excavations at Inamgaon near Pune ?

.....

(*b*) To which period does this belong ? .....

10. Define the following terms with suitable examples :

(*a*) Resource : .....

.....

(*b*) Non-resource : .....

.....

11. Justify the statement that technology consists of converting a non-resource into a resource.

.....

.....

.....

12. Classify the following into resource and technology :

seed, agriculture, horticulture, flower, cow, animal husbandry, nylon, iron, textile, metallurgy, coal, engine, flowing water, blowing wind, petroleum, coal, forest, wind mill, electricity

Resource.....

.....

Technology.....

.....

13. What changes are brought about when new technology is adopted ?

(*a*) .....

(*b*) .....

14. How has new technology changed the pattern of human life ?

.....

.....

.....

15. Why did early man restrict his activities to wood and stone only ?

.....

.....

16. (*a*) What were the main uses of copper for the early man ?

(*i*) ..... (*ii*) .....

(*b*) Why did metallurgists later on use bronze in place of copper ?

.....

(*c*) In what respect is bronze superior to copper ?

.....

17. Mention one important discovery which was made in the following ages :

(*a*) Stone age : ..... (*b*) Copper age : .....

(*c*) Bronze age : ..... (*d*) Iron age : .....

18. For what purpose did early man use the following sources of energy ?

(*a*) Flowing water : ..... (*b*) Blowing wind : .....

19. Why do we call technology as an applied science ?

.....

.....

.....

20. State one reason why technology was poorly developed in the early period of civilization ?

.....

21. (*a*) Why is coal nicknamed 'black gold' ? .....

(*b*) State one use of it. .....

22. Name two fuels which are superior to coal :

(*a*) ..... (*b*) .....

23. In what respect is agricultural society different from a nomadic society ?

.....

.....

24. How did the discovery of following change man's life ?

(*a*) Gun powder : .....

(*b*) Steam engine : .....

(*c*) Use of metals : .....

25. (*a*) Who invented the steam engine ? .....

(*d*) In what respect are diesel engines better than watt engines ?

.....

26. Define the term 'thermodynamics'.

.....

.....

27. What structures were seen by Galileo through his telescope ?

(*a*) ..... (*b*) ..... (*c*) .....

28. What correlation has telescope with the science of astronomy ?

.....

29. Define astronomy.

.....

.....

30. Name two scientists who developed rockets using liquid fuels :

(*a*) ..... (*b*) .....

31. What was the main use of V-2 rocket ?

.....

32. (*a*) When was the first launch space vehicle used ? .....

(*b*) Name two Americans who set their foot on the moon for the first time.

.....

33. In which period did development become faster ? .....

34. Why are the 16th and 17th centuries known as the age of reasoning and experimentation ?

(*a*) .....

(*b*) .....

35. Name four scientists of this period :

(*a*) ..... (*b*) ..... (*c*) ..... (*d*) .....

36. (*a*) Who invented Safety Lamp ? .....

(*b*) What scientific principles are involved in making it ? .....

(*i*) ..... (*ii*) ..... (*iii*) ..... (*iv*) .....

37. State three principles involved in an electric bulb :

(*a*) ..... (*b*) ..... (*c*) .....

38. (*a*) What does an industry do for us ?

(*i*) .....(*ii*) .....

(*b*) What led to the development of several industries in Europe and America during 18th and 19th centuries ?

(*i*) .....

(*ii*) .....

(*iii*) .....

(*iv*) .....

39. (*a*) What is meant by the industrial revolution ?

.....

.....

(*b*) During which period did this revolution gain momentum ?

.....

(*c*) How did it bring about change in man's life ?

(*i*) .....

(*ii*) .....

(*iii*) .....

(*iv*) .....

40. Mention atleast three reasons which helped England to become highly industrialised :

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

41. Mention two ways in which England profitted from India :

(*a*) .....

(*b*) .....

42. Why is it beneficial to sell processed material than raw material ?

(*a*) .....

(*b*) .....

43. How has medical technology helped in preventing epidemics ?

(*a*) .....

(*b*) .....

44. (*a*) In which year was the printing press invented ? .....

(*b*) What is its significance to present day man ?

.....

.....

45. What are the four reasons for the rapid adoption of a new technology these days ?

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

46. Why has plastic become so popular amongst us ?

(*a*) .....

(*b*) .....

(*c*) .....

47. One technology replaces another. Support your answer with the help of a suitable example.

.....

.....

.....

.....

48. Why is manure being replaced with the chemical fertilizers in Indian fields ?

(*a*) .....

(*b*) .....

49. Why are Saudi Arabia, Kuwait and UAE on the list of richest nations in the world today ?

.....

50. How does adoption of a new technology create new needs ?

.....

.....

.....

51. The needs and preferences of the villages have changed with the adoption of several new technologies. Comment.

.....

.....

.....

.....

52. Mention two harmful effects of using a new technology :

(*a*) .....

(*b*) .....

53. Why do we say that a gobar gas plant is a good example of excellent technology ?

.....

.....

54. What is meant by exponential growth ?

.....

.....

55. What technology has helped in decreasing the death rate in India ?

(*a*) ..... (*b*) .....

(*c*) .....

56. Mention two effects of dumping industrial waste in the environment :

(*a*) .....

(*b*) .....

57. What happens when an industry dumps water loaded with toxins in a river ?

(*a*) .....

(*b*) .....

58. What are the harmful effects of air pollution on the life of living things ?

(*a*) .....

(*b*) .....

59. Suggest four ways to prevent pollution :

(*a*) .....

(*b*) .....

(*c*) .....

(*d*) .....

60. What technological advances took place in the period 1940-1950 ?

(*a*) ..... (*b*) .....

(*c*) ..... (*d*) .....

61. Mention four new technological advances which took place in the last decade :

(*a*) ..... (*b*) .....

(*c*) ..... (*d*) .....

62. Who invented the following :

(*a*) Penicillium : .....

(*b*) First atomic fission : .....

(*c*) First rocket based on liquid fuel : .....

(*d*) Engine powered aeroplane : .....

63. Name the place where world's tallest building is located ?

.....

64. What is chemotherapy ?

.....

.....

65. Who made Nylon ? .....

66. Why made DDT ? .....

OBJECTIVE TYPE QUESTIONS

67. Fill in the blanks :

(*a*) Technology consists of converting a.....into a.....

(*b*) Technology and science are.....

(*c*) .....alloy is stronger than.....

(*d*) .....is called the black diamond.

(*e*) .....and.....of USA reached moon in 1969.

(*f*) Early man used hit or.....approach for.....

(*g*) An industry produces goods in .....and at low.....

(*h*) The printing press was invented in.....in.....

(*i*) The adoption of one technology creates the need for.....

(*j*) .....is an example of excellent technology.

68. Are the following statements true or false ?

(*a*) New technology increases the rate of development in an area. ( )

(*b*) Technology is often called applied science. ( )

(*c*) A nomadic tribe is better than an agricultural society. ( )

(*d*) The discovery of telescope led to the development of astronomy. ( )

(*e*) V-2 rockets were used by the Germans during peace time. ( )

(*f*) Neil Armstrong was as American. ( )

(*g*) A forest is a very valuable resource. ( )

(*h*) Radio broadcast network started in 1922. ( )

(*i*) First electronic computer was made in 1946. ( )

(*j*) Television was invented by Baird in 1936. ( )

69. Match the items in Column I with those in Column II.

Column I	*Column II*
(*a*) Television	Muller
(*b*) DDT	Baird
(*c*) Nylon	Fermi
(*d*) Bakelite	Carothers
(*e*) Penicillin	Bakeland
	Fleming and Florey

□□

ANSWERS TO SOME SELECTED NUMERICAL PROBLEMS

CHAPTER 4 :

53. (*a*) 98 (*b*) 18 (*c*) 100 (*d*) 60 (*e*) 40 (*f*) 63 (*g*) 149 (*h*) 133·5 (*i*) 164 (*j*) 161 ; **54.** (*a*) 58·5 (*b*) 16 (*c*) 106 (*d*) 80 (*e*) 98 ; **55.** (*a*) 82·35% (*b*) 21·21% (*c*) 46·66% (*d*) 13·86% **58.** $6{\cdot}023\times10^{23}$ **60.** $6{\cdot}023\times10^{23}$ **62.** $6{\cdot}023\times10^{23}$ **63.** (*a*) 196 g (*b*) 14 g (*c*) 8·5 g (*d*) 66 g (*e*) 160 g **64.** (*a*) 2 (*b*) 2 (*c*) 0·5 (*d*) 0·2 (*e*) 0·1 **65.** (*a*) 1 (*b*) 2 (*c*) 3 (*d*) 4 (*e*) 3 (*f*) 1 ; **66.** (*a*) $6{\cdot}023\times10^{22}$ (*b*) $1{\cdot}505\times10^{23}$ **67.** $2{\cdot}007\times10^{21}$ **68.** 5·75 g **69.** 2 **70.** 20 g water **72.** (*a*) 32 g (*b*) 48 g (*c*) 32 g **74.** 2 **75.** 44 g CO_2 **76.** $1{\cdot}99\times10^{23}$ g.

CHAPTER 5 :

11. (*a*) 395·6 KJ (*b*) 241·5 KJ (*c*) 395 KJ (*d*) 46 KJ (*e*) 2890 KJ (*f*) 890 KJ **12.** (*a*) CH_4 (*b*) 16 g (*c*) Butane **14.** 32·91 KJ **17.** (*a*) 46 KJ (*b*) 230 KJ **18.** 4450 KJ **71.** 7200 Coulombs **72.** 0·405 F **73.** 0·59 g **74.** 12000 C **75.** 0·00074.

CHAPTER 6 :

34. (*a*) 0·27 m/s (*b*) 27·77 cm/s **39.** 8 *h* **40.** 1400 Km **41.** 4 m/s **42.** 22 Km/h **43.** 6 h **44.** 16·66 m/s **45.** 0·55 m/s^2 **52.** 1 m/s^2 **53.** $2{\cdot}09\times10^{-2}$ rad/s **54.** 100 m/s^2 **55.** 4 s **56.** 80 m/s^2 **57.** 9·88 m/s^2 **58.** 20 m/s^2 **59.** 100 rad/s **60.** $-0{\cdot}417$ m/s^2 **62.** 25 Km **63.** 2 m/s^2 **64.** 300 m/s **65.** 12 m/s ; 720 m.

CHAPTER 7 :

58. (*a*) 2 m/s^2 (*b*) 5 m/s^2 (*c*) 8 m/s^2 **59.** 20 N 32 N **60.** 13 N **62.** 40 N **63.** 0.125 N **64.** 5 : 7 **65.** 5 N **66.** 26 N **67.** 5 Kgm/s **68.** 0·1 N **69.** 130 Kgm/s **70.** 20 N east to west **71.** 2 s **72.** 10 g.

CHAPTER 8 :

44. $2{\cdot}01\times10^{20}$ N **47.** 1·65 m/s^2 **49.** 60×10^{23} Kg **50.** 5 Kgm/s ; Zero **51.** 9·88 m/s^2 **52.** $6{\cdot}7\times10^{-9}$ N **53.** 49 N **54.** $3{\cdot}705\times10^{-8}$ N **55.** $2{\cdot}475\times10^{-8}$ N **56.** 9·8 N **58.** 0·45 s ; 4·4 m/s.

CHAPTER 9 :

23. (*a*) 2·8 s (*b*) 1·4 s **27.** (*a*) 40 s (*b*) 2 s **29.** (*a*) 24·6 s (*b*) 1·2 s **32.** 6 s **33.** 20 s.

CHAPTER 10 :

50. 0·4 m **52.** 0·005 s ; 800 m/s **53.** 1·5 m/s **54.** 8 m **55.** 2·5 m **57.** 500 m **58.** 1·4 Hz **60.** 20 Hz **61.** 0·2 m/s.

CHAPTER 11 :

40. 4900 J **42.** 300 J **43.** 225 J **51.** 9800 J **52.** 50 J **53.** 980 J **56.** 35280 J **57.** 245 J **58.** Zero **60.** 400 J **61** 2 J **70.** 600 J **71.** 5 m/s **72.** 1400 J

CHAPTER 12 :

23. 98·6 F **24.** 68 F **25.** (*a*) 98·6 F (*b*) 104·9 F (*c*) 238·64 F (*d*) 225·68 F (*e*) 212 F **26.** (*a*) 37°C (*b*) 40·55°C (*c*) 7·78°C (*d*) 5·56°C (*e*) 0°C **88.** $3{\cdot}76\times10^{4}$ J **89.** $1{\cdot}56\times10^{5}$ J **90.** $6{\cdot}27\times10^{5}$ J **91.** $16{\cdot}72\times10^{4}$ J **92.** 51×10^{-6}/°C **93.** 620 Kcal **94.** 30°C **95.** $2{\cdot}88\times10^{3}$ J **96.** 1·2 cm **97.** 50·0006 m **98.** 0·000252 m **99.** 5025 J **100.** 1×10^{-5}/°C **101.** 0·02 l **102.** 99·964 cm **103.** 21×10^{-5}/°C.

CHAPTER 13 :

28. 200 cm **29.** +5D **32.** +3·33D **33.** −10D **34.** 6 **35.** 8 m **36.** V=6·6 cm **37.** f=8 cm **38.** V=4 cm **39.** 6·67 cm **40.** V=−15 cm ; m=2·5 **41.** V=15 cm, m=−0·5 **42.** Convex ; f=+40 cm.

CHAPTER 14 :

9. 1 J **11.** 60 J **12.** 10 V **20.** 1A **36.** 110 Ohm **37.** 44 Ohm. **38.** 80 V **40.** 60 Ohm ; 6/11 Ohm **41.** 8/7 Ohm ; 14 Ohm **51.** 28·8 Kwh **52.** Rs. 13·20 **53.** 250 V ; 60 Kwh **54.** Rs. 21·60 **55.** 2 Kwh **56.** 3·6 Kwh **57.** 0·6 Kwh **58.** 15 Paise.

□□